RAILROAD GAZETTE

FRIDAY, MARCH 6, 1896.

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Contributions.

The Southern Pacific in Arizona.

LOS ANGELES, Feb. 20, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Of course I thought it suppressed—that item of the Southern Pacific in southern Arizona, which finally appeared in the *Railroad Gazette* of Feb. 14. Not the least interesting to me was the editorial comment on the construction of railroad news, for indeed the blue pencil must be unusually sharp over the clippings from the shore of a distant ocean. The implied honor of its emanating from my fertile brain is greater than the facts and my modesty warrant, although I will have to smother my pride and suppose I will have to tearfully father the rhetoric. As to the facts, these were first promulgated by the press of San Francisco. A letter to an editor of a San Francisco paper will bring more astonishing information than even my flights had conceived. Colonel Crocker of the Southern Pacific made the preliminary examination of the Arizona route, and has not denied the proposal. As he was in company in the territory with your own Whitelaw Reid, the latter also can furnish light. In short there are some facts to justify the conclusions.

As for the denial, the writer has been long enough in engineering to know that of course the engineers in authority have to deny knowledge of surveys, for is not this unseen notice hung on the office walls of all chief engineers: "All engineers must keep mum until the right-of-way-man has got in his work."

Then next winter, when you are escaping for your life from the blizzards of climate-cursed New York, and are rolling through Arizona in the editorial private car, *Railroad Gazette*, and have just Wells-Fargoed your overcoats back to "the States," and as the fragrance of orange and lemon groves from the open windows overpowers the smell from the locomotive coal, you will think: "Don't blame the S. P., if they did yarn a bit while getting right of way through these orange orchards." V.

The Sources of New York's Prosperity.

The American Society of Mechanical Engineers,
NEW YORK, Feb. 27, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of the 21st, under the heading "The Source of New York's Prosperity," a good deal is said about the value of manufactures in New York City. I wish to call your attention to one point which is often overlook by persons using these census figures. There is considerable duplication in these figures due to the fact that what is the finished product of one concern becomes the raw material of another. Thus, for example, the value of castings is included under the head of foundry products and then again under the head of machine shop products, for so far as the machine shop is concerned these castings are raw material. A moment's consideration will show you how rapidly the value of products grows, especially in a city.

Among the same figures is included the value of the jewelry manufactured in New York. If you deduct the value of the gold, gems, etc., how much will there be remaining?

It has always seemed to me that a far more significant figure would be what might be called "enhanced value due to manufacture." Or in other words, the value of products less the value of raw materials.

I do not want to give a discourse on census statistics, nor do I know the effect of this consideration on the arguments of Mr. North. I simply call your attention to the facts. H. H.

The Carriage of Bicycles.

NEW YORK, Feb 29, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your editorial of the 28th, in regard to free carriage of bicycles: We used over 30,000 bicycle tags last summer from June 1 to Sept. 1. Besides that, a great number of wheels were carried all over the road which were not tagged. You can readily appreciate from these figures the space the wheels took up in baggage cars, and when the baggage cars were filled people would take their wheels on the coach platforms. The handling of wheels last season was the source of many delays to our trains, loading and unloading, Sunday afternoons being the worst. GENERAL SUPERINTENDENT.

The Second Bridge Accident at Bedford.

CANTON, O., March 2, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Our attention has been called to the article on the second Bedford Bridge accident in your issue of Feb. 21. It seems to us that the standing the *Railroad Gazette*, as an ably edited paper should lead it to take more care in the publication of reports without verification than has been exhibited in this article, especially when an erroneous report indicating carelessness or incompetency tends to the injury of the contractor; and we ask you to record the following statement with as much publicity as you have the erroneous one:

The drift bolts referred to were 24 in. in length, passing through the 16 in. of the stringer and 8 in. into the cap. The bolts called for by the engineer of the street railroad company were only ordered by him about three hours prior to the accident and were at the bridge site on the evening of the same day. The stringers were not left unfastened; the timbers to be used for this purpose were 8 in. × 16 in., two under each rail. The three bents that fell had been temporarily tied together, and to the finished part of the structure by these timbers, which were laid down flat, reaching from cap to cap and drift bolted thereto, four sticks to each panel. That this had been securely done is shown by the fact that for the purpose of dragging other timbers along the viaduct into position the rope which led from the engine to the timber passed around the cap of one of the bents that fell, showing that it was sufficiently secured to withstand the pull of dragging these timbers into place even when at times the timbers would catch against other parts of the work.

The temporary structure as finished consists of 16 spans of 14 ft. each, the whole length of the viaduct being 364 ft., part of the old metal structure being used until the new one is completed.

At the time of the accident 12 of the 16 wooden spans had been completed, with the exception of the laying of the track and the bolting of the stringers to the caps, which had just been ordered.

The superintendent of erection had just placed two 8 × 10 pieces on the outside of the 8 × 16 timbers; he had given instructions to his men to drift bolt these pieces in position, then to loosen the 8 × 16, turn them on edge as stringers and drift bolt in place. As the men had already done the same thing 12 times he left them, feeling sure they knew just what to do, and especially so as they were no novices at the work. The superintendent went back to the engine to see to its dismantling and removal, as there would be no further use for it on the work. After giving these instructions he was on his way back to see that the men working on the stringers had been following out his directions, and had reached within about 40 ft. of this part of the work when the accident occurred. There does not seem to be any other possible explanation for the accident than that by some oversight the 8 × 10 pieces were not drift bolted in position; and, the structure being on a steep grade (about six per cent.) the moving of the timbers into position naturally tended to slide them down grade and drag with them the bents, thus made insecure.

When the proper time arrives we may point out to you some errors in your published account of the first accident, but have only to say now that remarks that either read, or may by interested parties be twisted to read, in a way derogatory to our standing as manufacturers and engineers, are not what we would have expected from the *Railroad Gazette*, at least when not supported by facts.

In conclusion, the Coroner has not found the Bridge Company criminally responsible, nor, so far as we know, has he yet rendered a verdict; and the Superintendent was placed under bond only for the purpose of holding him as a witness in the event that the verdict should require that the matter be brought before the Grand Jury.

WROUGHT IRON BRIDGE CO.,
By E. J. LANDOR.

[The comment on the accident of Feb. 11, published in the *Railroad Gazette* of Feb. 21, was not published "without verification" but was prepared by a competent engineer, on the ground. A comparison of the above letter with our account can scarcely be said to impugn our substantial accuracy. The statement that the coroner had rendered a verdict was taken from a Cleveland paper in which the alleged fact was stated in such unequivocal terms that there appeared to be no doubt that the reporter had secured his information from an authoritative source; but the next day, after the *Railroad Gazette* had gone to press, the coroner said that he had been misreported.—EDITOR RAILROAD GAZETTE.]

Floods in New England and New York.

Heavy rains prevailed in New England and Eastern New York Feb. 29 and March 1, and there were serious floods in all the large rivers, melted snow, with the rain, combining to raise the water in the streams higher, in many cases, than before for 15, 20 and 30 years. Mills were undermined, dwellings flooded and bridges carried away; and washouts of railroad tracks were reported without number. We can only briefly indicate the localities from which the worst damage is reported. In the Androscoggin River, at East Livermore, Me., many pulp mills were damaged. The Boston & Maine suffered at dozens of places in Maine and New Hampshire. The Maine Central was damaged at many places. The loss to mills and other property near Westbrook, Me., was estimated at many thousands; at Lewiston $250,000, and at Dover, N. H., $250,000. Washouts of railroad tracks and other damage are reported from many places in Vermont. The Connecticut River and its tributaries were very high, and a large vessel was carried away from its moorings at Hartford. There were numerous washouts on the Philadelphia, Reading & New England. On the New England Railroad a freight train was wrecked in a washout near Forestville, and one brakeman was injured. The Hudson River was higher at Troy than before since 1857. A large amount of lumber was floated off near the mouth of the Erie Canal. A costly wall was carried away at East Albany. Ice was lodged upon the railroad tracks at several places on the Upper Hudson, and on Sunday, Monday, Tuesday and Wednesday the trains of the New York Central, between Albany and New York, had to be run over the Harlem division, which is nearly all single track.

Bridges.—The principal bridge losses (which are omitted from the preceding paragraph) were as follows: At Crowley's Junction, Me., the bridge over the Androscoggin; the Boston & Maine bridge at Great Works; many bridges (total $100,000) at Dover, N. H.; four highway bridges on the Piscataquog, near Manchester, N. H.; the Maine Central bridges near Westbrook, Me., and at Cumberland Mills and Yarmouth. At Westbrook, two piers costing $60,000 were swept away. At Belfast, Me., seven bridges were carried away and a train near Burnham narrowly escaped going down. The Bradbury bridge at Biddeford was swept away by ice on Monday. In North Berwick, Me., 18 bridges were washed away out of 21 in the town. Several bridges, presumably short, were lost near Bristol and Terryville, Conn., and several small bridges on the Naugatuck division of the New York, New Haven & Hartford. The remaining portion of the temporary bridge over the Connecticut at Hartford, a part of which was carried away a few weeks ago, is entirely destroyed. At Middletown the false work and a part of the central pier of the new bridge were carried away by the ice.

The Baldwin-Westinghouse Electric Locomotive.

In July of last year the Baldwin Locomotive Works, of Philadelphia, and the Westinghouse Electric & Manufacturing Co., of Pittsburgh, joined forces to work together in the development of a line of electric locomotives suitable for various kinds of service to which steam locomotives are put. This is practically a working agreement, which gives to each company the advantage of the experience and capacity of the other. Such an agreement permits prompt estimates of the cost of construction and the filling of orders with the least delay. The companies have a joint engineer, Mr. David L. Barnes, who has charge of the experiments and designs.

Since entering into this agreement a nearly complete line of electric locomotives has been designed, and a catalogue will shortly be issued giving descriptions and cuts. The first locomotive to be built from these designs is shown by the illustration with this article. It is the express locomotive type for ordinary passenger train speeds, and has a range of capacity from 200 to 1,200 H. P. No change is made in the general design for this range of power. The freight locomotives for the same range of power have the same appearance as these illustrations and practically the same construction, with the exception of a lookout on the top of the locomotive cab to enable the trainmen to look back over the train.

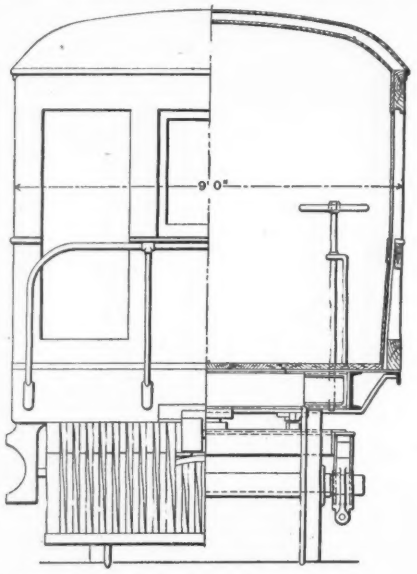
The switchers are similar in construction, but have a smaller cab. This cab is either placed in the center of of the locomotive or at one end. It is intended to use an electric crane on some of these switchers, and in this case the cab is placed at one end and the crane at the other. Such switchers may become very efficient wrecking locomotives and cars, and are provided with all apparatus, such as track jacks, chains, etc., and are expected to be useful in freight yards where cars are frequently derailed. These crane switchers can be used to advantage in unloading and loading cars.

Elevated motor and suburban locomotives are not unlike the ordinary passenger coach in general appearance, but the construction is quite different. The trucks are designed and finished in accordance with the best locomotive practice and are made rigid and strong. The underframe of these locomotives is of steel, with a plate of steel over the entire floor. The superstructure is similar to that of coaches, and is provided with seats as usual. Only one end is used for the controller, and at this end the door is at one side of the center, the controller being on the other side. At the opposite end the door is in the center and the motorman occupies the right hand end going ahead. When the car is running the other way there are drop seats, which make available the space occupied by the motorman. There are no parti-

tions in these locomotives, but a drop curtain is provided back of the motorman to be pulled down in case of interference by the passengers. A locomotive of this type is now under construction, and will be completed within a short time.

A large mine locomotive of 200 H. P. capacity, to haul 50 mine cars up 2 per cent. grade, is nearing completion for the Crozer Coal and Coke Co., of Upland, Pa., to be used in the Elkhorn mines of West Virginia. This locomotive is an entirely new design and differs materially from other mine locomotives. The design is like a steam locomotive in detail as all of the parts are made of the best material, with planed fits and turned taper bolts. The frames are of wrought iron and the driving wheels have steel tires and parallel rods.

The electric rack locomotives have been designed to take either the Abt or Riggin back system of rack gears. Probably no adaptation of electricity to steam locomotive service is so satisfactory as that to rack roads, for the reason that the power of the electrical rack locomotive does not depend upon the weight of the machine. With the steam locomotive the engine and boiler plant has to be carried along with it, and this reduces the train load very much. With the electric locomotive the



Electric Locomotive—End View and Section

total weight only need be that necessary to keep the gears in the rack, and the difference in the weight is made up in useful train load. The use of electricity on rack roads gives increased efficiency, a larger percentage of useful train weight, higher speed and less complicated machinery.

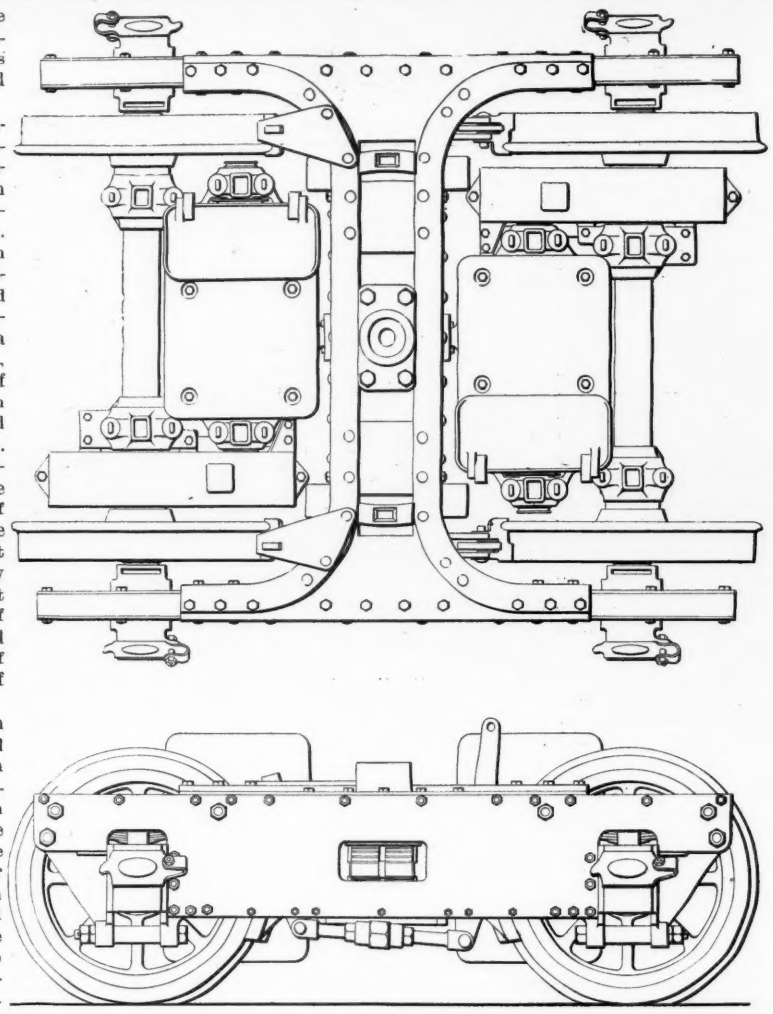
The Turtle Creek Branch of the Pennsylvania Railroad, which passes the works of the Westinghouse Electric & Manufacturing Co., at East Pittsburgh, is being equipped for about a mile with the overhead construction for double trolleys and with the button system for the Wheless electro-magnetic apparatus. The line equipment will be such as to permit experiments to be made with direct and polyphase current, both with the button and trolley systems.

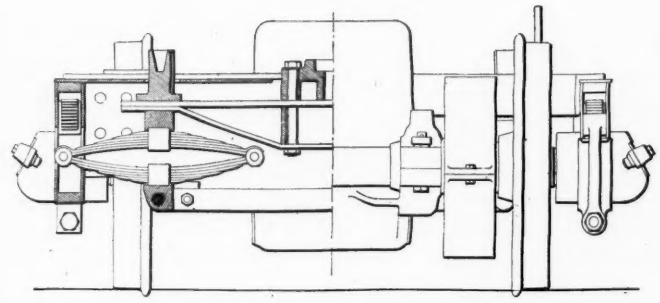
Tesla motors of the induction type and several sizes of of series motor have been constructed for these locomotives. An extra set of trucks will be made for the large locomotive shown by the illustrations with this, so that with an hour's notice an exhibit can be made with both the Tesla and the series motor. The set of exhibits when complete will include the following: 400 H. P. express locomotive, 400 H. P. freight locomotive, 1,000 H. P. express locomotive, 1,000 H. P. freight locomotive, and 400 H. P. elevated or suburban locomotive. These will be on the direct system. With the Tesla system there will be a 200 and a 400 H. P. freight and express locomotive and a 200 and a 400 H. P. elevated or suburban locomotive. Arrangements will be made to test these locomotives at different line pressures and with a variety of loads and speeds. The exhibit for elevated railroad service will be very complete, as the line is long enough to permit a run equal to five or six stations of an elevated road, so that by reversing promptly at the end of the run the equivalent exhibit of an hour's run or more on an elevated road can be made.

The different types of controllers which have been designed for this line of apparatus will be exhibited in such a way as to be readily comprehended by railroad men. It has been the intention in designing all of this apparatus to gain accessibility and simplicity, so that the ordinary mechanic can, after a little study and inspection, understand the purpose of the different devices, even when he cannot comprehend the theory of operation. Even with the steam locomotive, the engineer, while he understands the object of all the different parts on the steam locomotive, does not often comprehend the theory of operation of the different devices. With this line of electric locomotives, the end sought has been a degree of simplicity equal to that of steam locomotives.

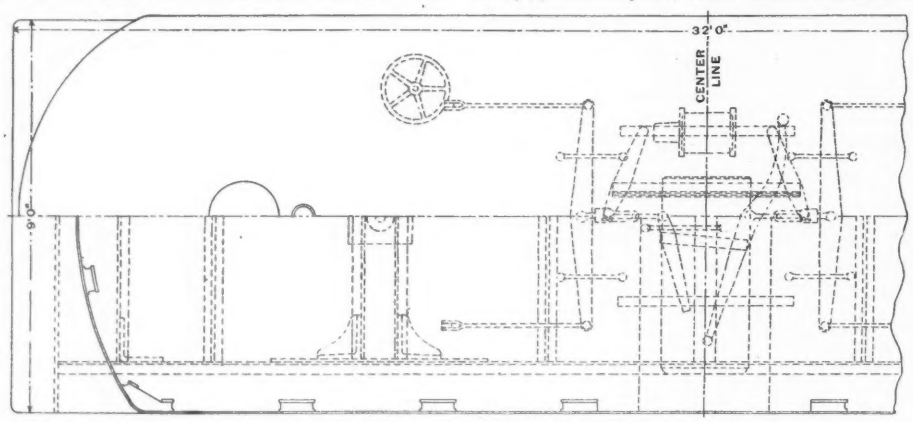
The large locomotive shown by the illustrations will weigh, when completed with all essential parts for operation, about 90,000 lbs., which is sufficient weight to give the necessary adhesion to use the pulling power of four 100 H. P. motors, but with four 200 H. P. motors it will be necessary to increase the weight. This will be done by adding the necessary cast-iron foot plates to the locomotive. The 1,000-H. P. locomotive will probably be made to weigh about 160,000 lbs. This is done without change of construction, as the underframe and trucks have been designed to carry this weight.

There is a pilot at each end with the Janney coupler attachment. A short platform at each end enables the engineer to pass across from one side of the locomotive to the other at the ends. The end doors are at the right hand side at each end when facing toward the end. There are two headlights, one at each end, which are lighted either by oil or electricity. A large gong about 19 in. in diameter is placed on the top of the cab; also an air whistle. The side doors permit the locomotive to receive and discharge freight or baggage. The sides of the cab are covered with sheet steel and the interior is painted green, like a locomotive cab. The cab is constructed of oak with large posts, and adapted to take the shocks that are received in switching and in making up trains. The underframe is composed of channel irons joined together by proper transoms and covered on top by ⅛-in. steel plate, which extends from end to end





Details of Truck for Baldwin-Westinghouse Electric Locomotive.



Plans of Baldwin-Westinghouse Electric Locomotive.

This plate is intended to give the frame strength to resist the shocks in coupling and prevent distortion. It also provides a base plate to which all the mechanism can be attached. The edge of the plate is finished by an angle iron as shown. These locomotives are equipped with a new form of air pump without gears. This pump is very efficient and almost noiseless. It is placed underneath the locomotive.

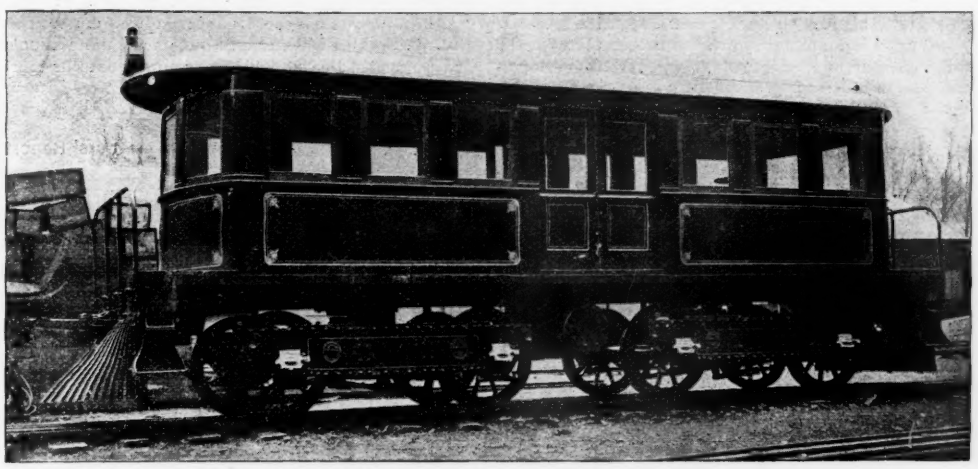
The trucks are shown in the engravings. These are from the truck that will go under the suburban locomotive, but the large trucks are exactly the same in appearance, the dimensions being different. The jaws on the outer ends of the truck are pivoted so they can be swung up by moving the pedestal bolts, and the wheels and axles can be removed without taking the truck from under the locomotive. The trucks have swing bolsters, triple elliptic springs and springs over the axle boxes and ride as easily as the trucks used under passenger cars. The side frames are made of two plate of steel separated by wrought-iron spacers and bolted through with turned taper bolts. The truck jaws are of cast steel and are planed where they work against the axle boxes. The axles are large, being 6½ in. in diameter, and are made of the best open-hearth steel. The wheels are of the Vauclain wrought-iron, two-hole type, with steel tires and retaining rings. The brakes are independent on the opposite side of the truck and are connected together under the floor of the locomotive by a single brakebeam. This removes the brakebeams from the trucks and gives more room for the motors. The design is such as to permit the swing bolster, the springs, the motors or brakes, each to be removed independently without interfering with the other parts. The axles and wheels can be removed without removing the motors from the trucks.

All the wiring for rheostats and instruments is above the floor of the car, and the only wires that pass through the floor are those that lead to the motors. The rheostats are above and not below the floor. This gives a short and simple wiring that may be readily understood by anyone accustomed to electrical work and reduces the complication considerably. The motors are provided with safety hangers to prevent falling on the track in case of accident. Provision is made for parallel rods on these trucks when desired. Sand boxes are used if necessary.

This line of electric locomotives differs materially from the large electric locomotives proposed before this. One important difference is in the type of motors used. These locomotives have geared motors even for the largest powers. This is done to permit a variation in speed where

necessary without any change in design, and to give accessibility and reduce the cost of repairs. The experience so far obtained with gearless locomotives of large size shows that the cost is excessive and that repairs are difficult. The most practical form of gearless locomotive is that in which the armature surrounds the driving axle. It has sometimes been placed directly on the axle and again on a sleeve through which the axle passes. When placed directly on the axle, there is a heavy dead load without springs which it is not safe to carry on a rough track. The jars to which the armature is subjected in this construction will rapidly deteriorate it. It must be remembered that not only is the armature placed directly on the axle in this construction, but the fields are also supported thereon on bearings. This places the entire weight of the electrical machinery directly on the axles without spring supports. In the case of the sleeve surrounding the axle there can be a slight motion, say of about ⅛ in. between the motor and the axles, which reduces the jar somewhat but does not give the degree of flexibility that is obtained in steam locomotives. The sleeve construction requires the use of a clutch for the end of the sleeve to drive the axles, and this increases the complication. The expense of the sleeve construction is nearly double that of the construction where the armature is placed directly on the axles. Both of these designs require slow-speed motors, which are not efficient and are very expensive. In making repairs, the driving wheels generally have to be removed from the axles in order to get at the armatures, and this requires removing the tires from the driving wheels before the wheel centers can be pushed off the axles.

In case of a change of speed an important change has to be made in the wiring of the gearless motors, while with the geared type the change in the speed only affects the ratio of the gearing. A locomotive built of the gearless type adapted for one range of speed cannot be used advantageously at any other range of speed: that is, a freight locomotive could not be used in passenger service without rewinding the electric motors. With the geared motors, a change in the ratio of the gearing, which can be made in about one hour, will permit an entire change in the range of speeds. The repairs to geared motors can be made without disturbing the other parts of the locomotive. The armature can be removed without taking the motors from the trucks and without interfering with any of the other important parts. The weight per horse power of the gearless motors is several times as great as that of the geared motors and the cost is correspondingly high. The cost of electric locomotives devised for the Baldwin-Westinghouse combination is practically the same as the best steam locomotives, which can do the same work. The cost of the gearless locomotive is about three times as much, while the efficiency of the geared type is much higher.

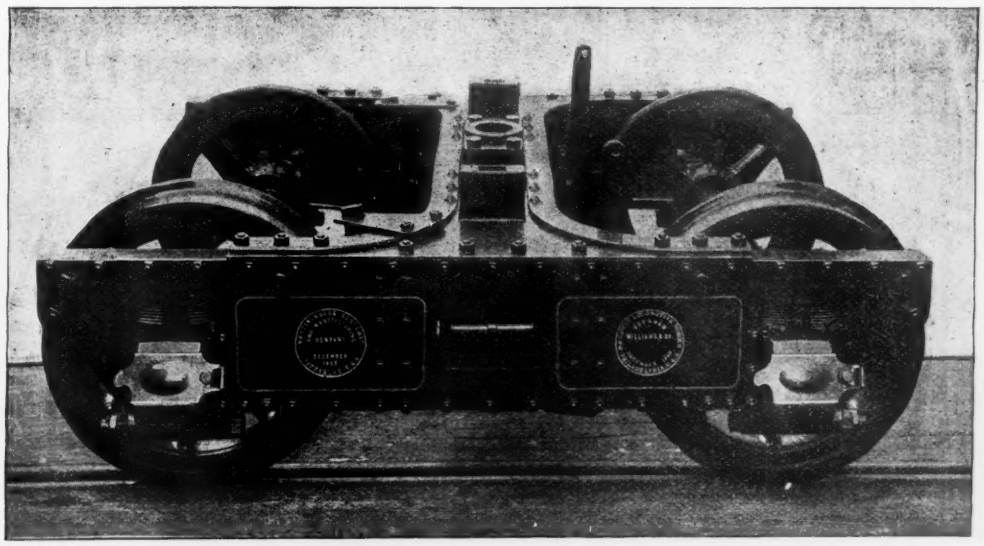


Baldwin-Westinghouse Electric Locomotive.

The Baldwin-Westinghouse catalogue, showing these locomotives and giving much useful information, will soon be issued.

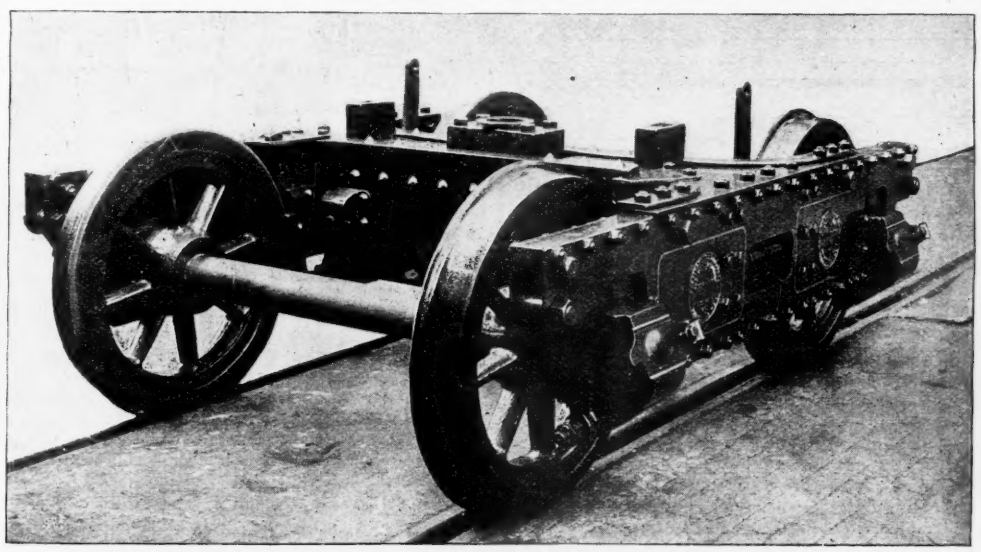
New York Merchants' Opinion of the Joint Traffic Association.

The action of the New York Board of Trade and Transportation, expressing its satisfaction with the working of the Joint Traffic Association for the first seven weeks of its existence, was noted in the *Railroad Gazette* of Feb. 28. The report of the committee, signed by Messrs. F. B. Thurber, Seth E. Thomas, John A. Elmendorf, Chas. H. Patrick, Oscar S. Straus, is as follows:



Truck for the Baldwin-Westinghouse Electric Locomotive.

Your committee respectfully reports that the new joint traffic arrangement between the principal railroads east of the Mississippi and north of the Ohio has now been in operation a month, and has apparently worked for the mutual interest of the public and the railroads. That there is a mutual interest no student of the transportation question can deny. It is true that rates may be too low as well as too high for the public interest, and that the public is best served by *reasonable*, *uniform* and *stable* rates. While there may be a few shippers who may for their own interest prefer a chaotic condition of affairs, the great majority prefer an administration of our transportation lines described by the above three words, and hence favor any arrangement, whether under the name of joint traffic association, or a pool, which will insure these conditions.



Truck for the Baldwin-Westinghouse Electric Locomotive.

There is no longer any danger in this country of excessive charges for transportation. The competitive conditions, underlying which is our unrivalled system of waterways, insures in this country lower rates for transportation than in any other country in the world. This is illustrated by the following figures from the advance report of the Interstate Commerce Commission, dated Dec. 1, 1895, and from other reliable sources. "The average charge for sending a ton of freight one mile on 13 of the most important railroads in the United States during 1865 was 3.08 cents; in 1870, 1.80 cents; in 1875, 1.36 cents; in 1880, 1.01 cents; in 1885, 0.83 cents; in 1890, 0.77 cents; in 1893, 0.76 cents." These railroads performed one-third of the entire transportation in 1895 and from the figures given it appears that 0.76 cents would pay for as much transportation over their lines in 1895 as could have been obtained for 3.08 cents 28 years earlier. This reduction, amounting to three-fourths of the average rate of 1865, was exceeded by that in price of but few even of those articles in the manufacture of which new inventions have worked the most radical changes.

The entire transportation performed by the railroads of the United States during the twelve years ending June 30, 1894, was equivalent to moving 136,799,677,822 passengers and 807,935,382,838 tons of freight one mile. Had rates averaging as high as those of 1882 been collected on this traffic the railroads would have earned $2,629,043,459 more than they actually received in these twelve years.

The total amount of reported railroad capital on June 30, 1894, was $10,796,473,813, or $62,951 per mile of line. Of this $4,834,075,659 was capital stock, while the funded debt represented by bonds and other securities was $5,356,583,019. The amount of stock paying no dividends was $3,066,150,094, or 63.43 per cent. of the total amount. The amount of bonds paying no interest was $650,573,789, or 14.17 per cent. The amount of miscellaneous obligations paying no interest was $53,426,264, or 11.71 per cent., and the amount of income bonds paying no interest was $210,757,554, or 86.94 per cent.

During the three years ending December 31, 1894, receivers were appointed for railroads having a total length of 46,875 miles, capitalized at $2,534,529,000.

These statistics of diminishing returns to investors, financial disasters and widespread insolvency clearly indicate that the present railroad charges are not too high, unless it is desirable to reduce all the railroad corporations to the condition of uniform and hopeless bankruptcy, even if they do not demonstrate, as might be urged with some evidence of justification, that the returns now produced by railroad rates are actually lower than is reasonably just or to the interest of the general public. The frequent failure of railroad enterprises to prove remunerative results in difficulty to secure capital for new and often much needed lines, and in the exaction of conditions which afford at least a chance of extraordinary profit as an offset to what is regarded as the hazardous nature of the investment. This opportunity for large returns often takes the form of an excessive discount on the securities offered, or what is much the same thing, a large stock bonus to accompany sales of bonds, this being amongst the most frequently deprecated methods of "stock watering."

But few persons appreciate the importance of the railroad industry to all the material interests of the United States. Without it, vast tracts of fertile land would remain unproductive for lack of a market. It touches the industries of the country at every point. The number of railroad employees in the United States in 1893 was about 874,000 men. Owing to severe depression in the railroad business, this number in 1894 had fallen to about 780,000. Wages were lowered directly and time was reduced, producing the same result indirectly. Industries depending on the railroads as buyers experienced a lack of demand, and in turn were forced to curtail the working forces or reduce wages, and many millions of people, besides those actually discharged and their dependents, found themselves less able to buy the necessaries of life. From this it will be seen that the public are interested in not having rates for transportation too low as much as they are that they shall not be too high, or that they shall not unjustly discriminate between shippers or sections.

In conclusion, we respectfully submit the following resolution:

"*Resolved*, That shippers should co-operate with carriers, and carriers with shippers, to maintain reasonable, uniform and stable rates of transportation, and to this end we invoke a fair trial of the Joint Traffic Association."

Chicago, Rock Island & Pacific 60,000-lb. Gondola Cars.

The Wells & French Company, of Chicago, recently built 100 gondola cars for the Chicago, Rock Island & Pacific. These cars are 37 ft. 2¾ in. long over deadwoods, and 33 ft. 4⅛ in. inside of end boards. The width

between side boards is 8 ft. ⅛ in., and height of sides 2 ft. 3 in. Figs. 1 to 4 inclusive show their construction.

All longitudinal sills are framed to end sills by double tenons 1½ in. long, extending the full width of the sills. The two center sills are 5 in. × 8 in., the four intermediate are 4½ in. × 8 in., and the two side sills 5 in. × 13¾ in. All are yellow pine, and are held firmly together by two ⅞-in. tie rods. The two end sills, 8 in. × 9¾ in., white oak, extend 3 in. on each side beyond the face of side sills.

The needle beams are 4½ in. × 11 in. white oak gained out, 5¾ in. for the side sills and ½ in. for intermediate and center sills. They are secured to each side sill by a ¾ in. bolt and to the other sills by ⅝ in. bolts.

The draft timbers are white oak 5 in. × 8 in., extending from face of dead woods under the end and center sills to the needle beams against which they bolt. Between the needle beams are 4½ in. × 5 in. white oak filling pieces in line with the draft timbers. These are secured to center sills by three ⅝-in. bolts. The draft timbers are keyed to the center sills with the usual cast-iron keys and are bolted on with ⅞-in. bolts. Deadwoods are 7⅝ in. × 6 in. × 24 in. white oak resting on draft timbers and secured to them by two ⅞-in. bolts. They are held against end sills by two ¾-in. bolts extending × 12¾ in., the bottom board placed 1 in. above the floor. They are secured to the stakes by ⅛-in. bolts, and to sills by ¾ in. rods as shown. Wrought iron corner plates hold the end and side boards together.

The cars are equipped with Westinghouse quick action automatic air-brakes, Marden brake beams and Janney couplers.

The trucks shown in Fig. 5 are of the rigid diamond type with trussed wooden bolsters. The center plates are cast iron, journal box lids pressed steel, iron axles, 33-in. cast-iron wheels. The bolsters are made of three pieces, two 3¼ in. × 8½ in. and one 6½ in. × 8½ in. white oak bolted together, and faced with ¼-in. iron plates at the center. We are indebted to Mr. Geo. F. Wilson, Superintendent of Motive Power & Equipment, for the drawings.

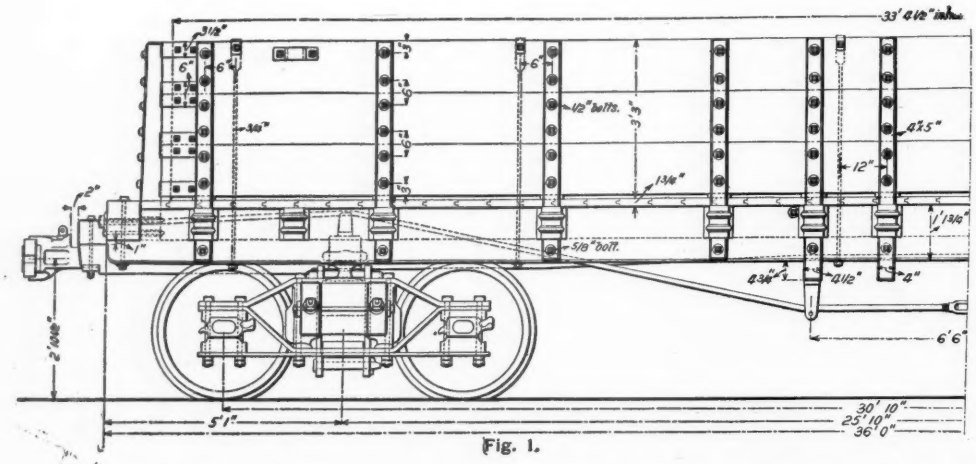


Fig. 1.

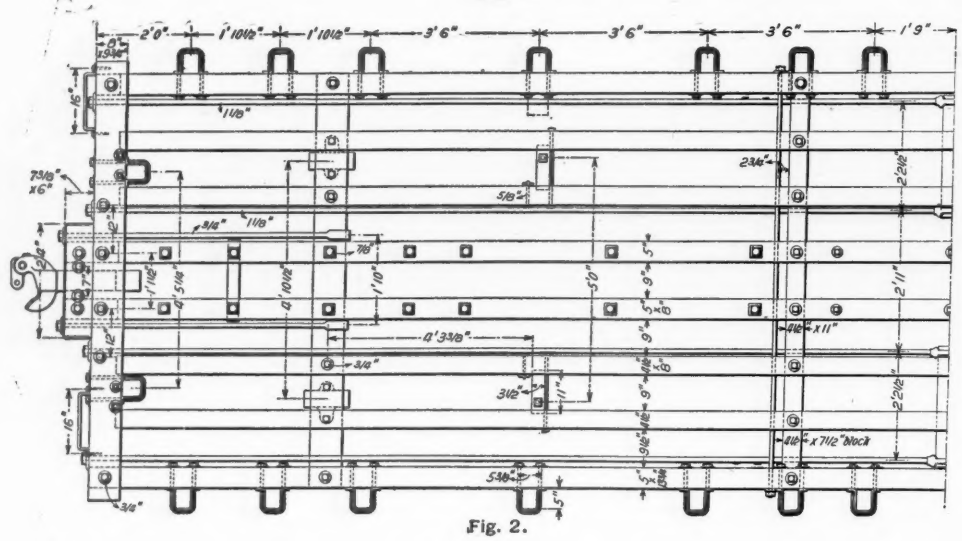


Fig. 2.

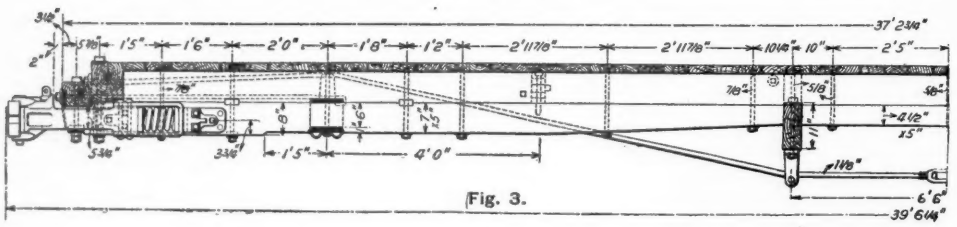


Fig. 3.

Standard, 36-ft. Coal Car, Chicago, Rock Island & Pacific.

back to the body bolsters and lipped over the top plate of the same. A ¾-in. × 4-in. × 14-in. wrought-iron strip is let into the face of the deadwood. Brake hanger blocks 3½ in. and 8 in. are placed between the intermediate sills and are secured to the sills by ⅝-in. bolts.

The body bolsters are wrought iron, and are made of two plates, the upper ¾ in. × 8 in. and the lower 1 in. × 8 in. The upper plate is let into the center and intermediate sills its full depth, and has its ends turned down to receive the side sills. It is secured by bolts as shown in illustrations. Schoen pressed steel center plates are used. The flooring is 1¾ in. hard pine, laid flush with top of end sills and projecting 1½ in. beyond face of side sill. There are 12 stakes on each side, and two on each end of car secured to side and end sills by Schoen pressed steel stake pockets and to side sills also by ⅝-in. bolts. The stakes at needle beams extend down flush with bottom of beams, and those intermediate project 4¾ in. below side sills. They are stiffened at their lower ends by cast-iron brackets. This is in accordance with the recommendation of the Master Car Builders' Association at the last convention. The side and end boards are 2⅜ in.

Iowa Railroad Commissioners' Report.

The eighteenth annual report of the Railroad Commissioners of Iowa has been issued. It is dated Dec. 2 and is for the year ending June 30, 1895. The failure of the railroads to report all information desired continues to embarrass the Commissioners as heretofore, and the report repeats the former complaint.

The length of railroad in Iowa is 8,486 miles. The subject of freight rates is discussed at length with suggestions as to changes in laws. The regulation of joint freight rates over two or more roads within the state, which has been the subject of much discussion in Iowa, is reviewed at length. The railroads have not seriously complained of the order of the Board fixing such rates at 80 per cent. of the sum of the local rates. Demands on the part of the public for better station facilities and for private sidings are discussed at length.

The information reported by railroads is tabulated in great detail, but much of it is incomplete, owing to the failure of important roads to answer the questions printed on the blanks. The number of truss bridges in the state is 627, with an aggregate length of 89,466 ft.; something over half of this length is made up of iron or steel structures. The number of trestles in the state is 10,724, with an aggregate length of 892,031 ft. The number of street crossings is 9,468, made up as follows: At grade, 9,108, of which 147 are guarded by gates and flagmen; above track, 142; beneath track, 218. About half of the over bridges are 21 ft. or more above the track. Four passengers, 47 employees and 82 other persons were killed during the year, and 39 passengers, 330 employees and 74 other persons were injured. The total number of persons killed in derailments and collisions was 12, but it does not appear how many of these were passengers.

The condensed returns of the railroad companies, containing the names of officers and other information not tabulated fill 40 pages; the reports of hearings, adjustment of complaints, etc, take about 130 pages. This matter is followed by a digest of judicial decisions and an index of all the reports of the Board since its organization in 1878. The report is signed by John W. Luke, Geo. W. Perkins and Chas. L. Davidson, Commissioners. Mr. Luke died Dec. 21, and the volume contains a brief sketch of his life, with a portrait.

North Carolina Railroad Commissioners' Report

The Railroad Commissioners of North Carolina, James W. Wilson, E. C. Beddingfield and S. O. Wilson, have issued the fifth annual report of the Board, dated Dec. 31. As in previous years the report is very brief; it occupies only two pages. The Commission have carefully heard every complaint, have inspected the railroads as far as possible and always when track or station buildings were complained of. The taxable property of the railroads has increased $537,837 since 1894. The length of railroad in the state is 3,399 miles (and of track 3,616 miles), an increase over 1894 of 34 miles. The Milton & Southerlin, the Laurel River & Hot Springs and the Hamilton railroads have been abandoned for lack of business sufficient to keep them in repair. There has been a very great improvement in business, and only three roads are now in the hands of receivers. The North Carolina Railroad has been leased to the Southern for 99 years at a rental sufficient to abolish the exemption from taxation heretofore enjoyed by that road.

This ends the report proper, but the book weighs 2½ lbs., nevertheless, and the remaining 700 pages are devoted to tabular matter, spread out at great length. About 40 pages are taken up with reports of decisions of the Commissioners.

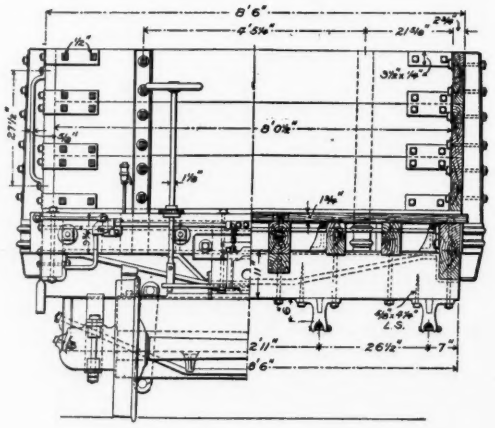


Fig. 4.

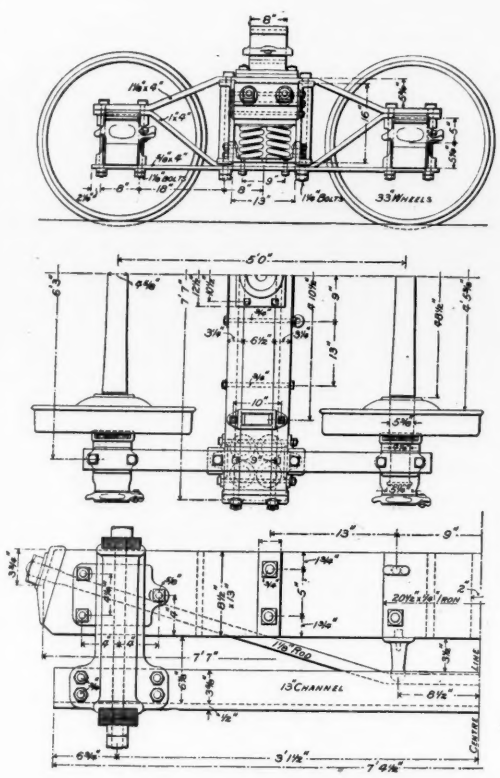


Fig. 5.—Rigid Truck, C., R. I. & P., 50,000 and 60,000-lb. Cars.

A Recent Schenectady Consolidation Locomotive.

The Schenectady Locomotive Works have lately built five consolidation locomotives for the Midland Terminal Railway. An engraving from No. 2 of that lot is published in this issue, and the descriptive specifications follow.

CONSOLIDATION FREIGHT LOCOMOTIVE FOR THE MIDLAND TERMINAL RAILWAY.

General Dimensions.

Gage	4 ft. 8½ in.
Fuel	Bituminous coal
Weight in working order	149,000 lbs.
" on drivers	132,000 "
Wheel base, driving	14 ft. 4 in.
" " rigid	14 " 4 "
" " total	22 " 3 "

Cylinders.

Diameter of cylinders	21 in.
Stroke of piston	26 "
Horizontal thickness of piston	5½ "
Diameter of piston rod	3½ "
Kind of piston packing	Cast iron—Company's style
" " rod packing	U. S. metallic
Size of steam ports	18 in. × 11¼ in.
" " exhaust ports	18 " × 23¼ "
" " bridges	1⅛ "

Valves.

Kind of slide valves	Richardson balanced
Greatest travel of slide valves	5½ in.
Outside lap " " "	¾ "
Inside " " "	3/32 "
Lead of valves in full gear	1/16 "
Kind of valve stem packing	U. S. metallic

Wheels, Etc.

Diameter of driving wheels outside of tire	52 in.
Material " " " centers	Steeled cast-iron.
Tire held by	Shrinkage.
Driving box material	Steeled cast-iron.
Diameter and length of driving journals	8½ in. diam. by 9 in. long.
" " " " main crank pin journals	6 in. diam. by 6 in. long.
Diameter and length of side rod crank pin journals	Main 6½ in. × 5 in. Inter. 5 in. × 4½ in. F. & B., 4½ in. diam. by 3¾ in. long.
Diameter and length of engine truck journals,	6 in. diam. by 10 in. long.
Diameter of engine truck wheels	30 "
Kind " " " "	Paige steel tired.

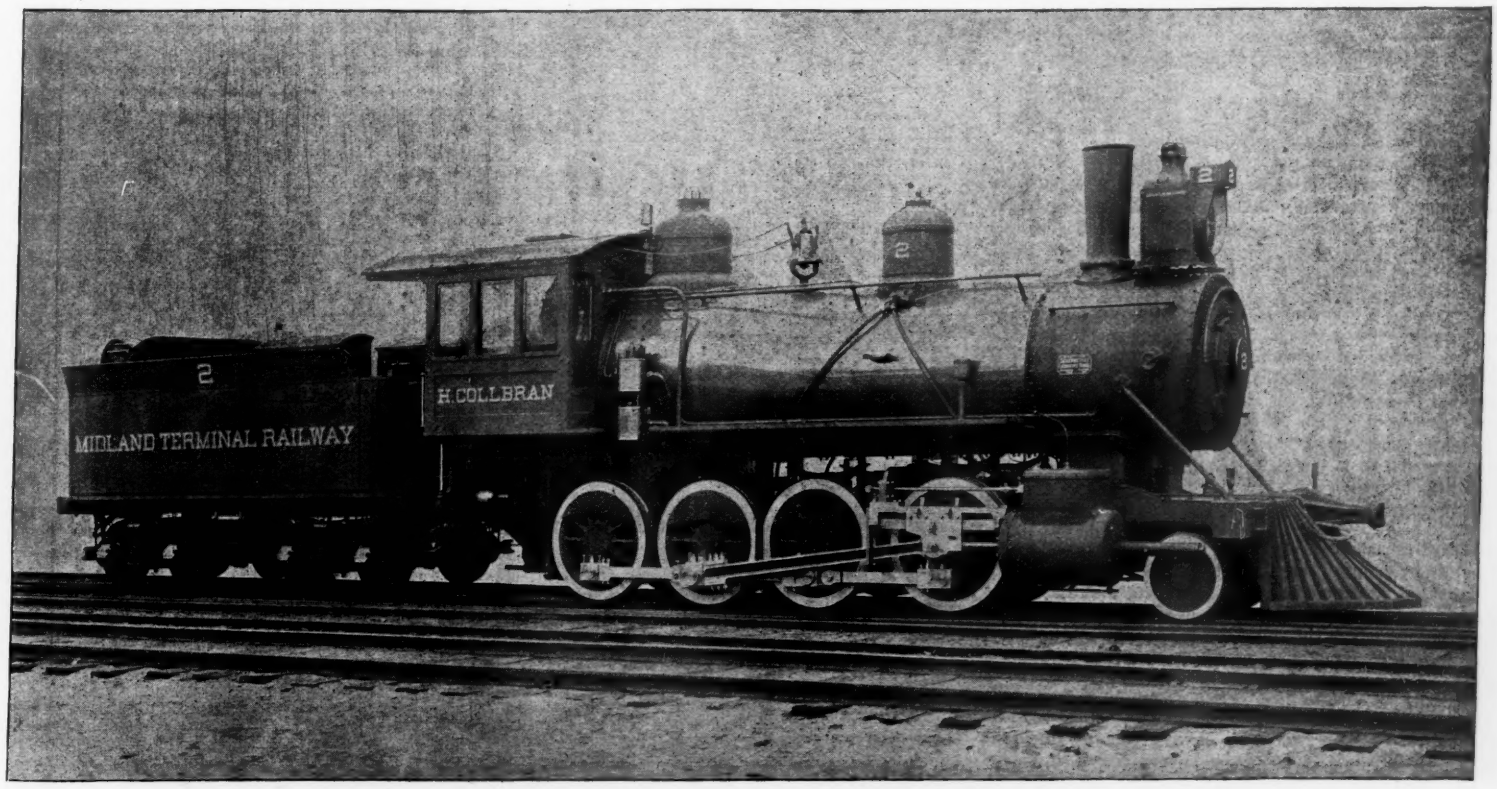
Boiler.

Style	Wagon top.
Outside diameter of first ring	62¼ in.
Working pressure	170 lbs.
Material of barrel and outside of firebox	Carbon steel.
Thickness of plates in barrel and outside of firebox,	5/8 in., 5/16 in., ½ in. and ½ in.
Horizontal seams, butt joint, sextuple riveted, welt strips	inside and outside.
Circumferential seams	Double riveted.
Firebox, length	108 in.
" width	42¼ "
" depth	F 63¾ in., B 60¾ in.
" material	Carbon steel.
" plates, thickness, sides,	5/16 in.; back, 5/16 in.; crown, 5/16 in; tube sheet, 3/8 in.
" water space	front, 4 in., sides, 3 in., back, 3 in.
" crown staying	6 in. × ¾ in. Crown bars.
" stay bolts	1⅛ in. diam., U. S. iron.
Tubes, material	Franklinite, No. 11 W. G.
" number of	258.
" diameter	2¼ in.
" length over tube sheets	13 ft.
Heating surface, tubes	1,962.2 sq. ft.
" " firebox	162.3 " "
" " total	2,124.5 " "
Grate "	31.7 " "
" style	Rocking, finger bars.
Ash pan "	Hopper, with slides.
Exhaust pipes	Single.
" nozzles	4⅞ in., 5¼ in, and 5½ in. diam.
Smoke stack, inside diameter,	18 in. at bottom, 16 in. at smallest part, 19 in. at top.
" stack, top above rail	14 ft. 9 in.
Boiler supplied by	Two No. 10 Monitor injectors.

Tender.

Weight, empty	40,100 lbs.
Wheels, number of	8
" diameter	33 in.
Journals, " and length	4¼ in. diam. by 8 in. long.
Wheel base	15 ft. 6½ in.
Tender frame	6½ in. × 4 in. × ¾ in. angle iron.
" trucks	S. L. W. standard 4-wheel, channel iron, center-bearing front and back, additional side bearings on back truck.
Water capacity	4,000 U. S. gallons
Coal "	11 tons
Total wheel base of engine and tender	48 ft. 9½ in.
" length " " " "	57 ft. 6¼ in.

Engine fitted with American steam brake on all drivers. Westinghouse automatic air-brake on tender and train. Westinghouse 9½ air pump. Le Chatelier water brake on cylinders. Magnesia sectional boiler covering.



CONSOLIDATION FREIGHT LOCOMOTIVE FOR THE MIDLAND TERMINAL RAILWAY.

Built by the SCHENECTADY LOCOMOTIVE WORKS, *Schenectady, New York.*

The Question of Large Cars.

At the February meeting of the New York Railroad Club a report on Large Freight Cars was presented by a committee consisting of Mr. W. W. Wheatly, Car Accountant of the West Shore; Mr. George L. Fowler, Consulting Engineer; and Mr. F. Moore, Car Department Ontario & Western The report is an excellent document and gives, besides the studies and conclusions of the committee, many valuable suggestions from correspondents. The synopsis which follows, although long, hardly does justice to the report.

The present consideration is not alone from the standpoint of one department, but from that of all the principal departments. It refers not only to economical transportation from the traffic and operating standpoint, but also to the limitations upon the use of large cars from the standpoint of the mechanical and maintenance of way departments. It refers not only to future construction of cars, but to the means of utilizing the present equipment.

Within twenty years the capacity of the average freight car has been increased threefold. For many years, say from 1855 to 1876, the standard capacity of freight cars was 20,000 lbs. About 1879, the principal East and West trunk line roads commenced to construct cars to carry 40,000 lbs. About 1883 the 50,000-lbs. capacity car made its appearance, and about 1889 some roads commenced to build cars of 60,000-lbs. capacity, which is now considered the standard. But within the past year the L. S. & M. S. N. Y. P. & O., the Pennsylvania Company, and perhaps a few others, have added some 80,000-lbs. capacity coal and ore cars to their equipments. The committee is not aware that any box cars of a greater capacity than 60 000 lbs. have been constructed.

The reasons for the steady increase of car capacity have been varied. One of them has been the fact that freight classifications make no distinction in minimum carload weights between large and small cars, but increase in car capacity has not been exclusively in those carrying light and bulky articles. The main reason for this increase has been the necessity for economy in transportation. It has been in the direction of moving a given quantity with the smallest number of cars and the smallest number of trains.

A pertinent point for consideration at this time is whether the modern freight car has now reached the maximum profitable limit of its dimensions and carrying capacity, from an economic standpoint. The following table, showing, since 1876, the relative increase in dead weight of car and weight of paying load, and the percentage of each to the total loaded weight, may be of assistance in arriving at a conclusion :

Year.	Dead weight of car.	Weight of paying load.	Total weight loaded.	Weight of car. Percentage of total.
	Lbs.	Lbs.	Lbs.	
1876	20,500	20,000	40.500	53.62
1882	24,000	40,000	64,000	37.50
1889	27.700	60,000	87,700	31.59
1895	36,000	80,000	116,000	31.04

Assuming that these cars are loaded to their full carrying capacity, the benefit of the large increase in the proportion of "paying load" to "total load," and the large decrease in the proportion of "dead weight" to "total load," is too obvious for comment. It seems, however, from a careful study of these figures, to be hardly probable that any further advantage can be gained in the construction of wooden cars of a greater capacity than 70,000 or 80,000 lbs , because of the necessity of increasing the size and strength of the parts, which will add greatly to the proportion of dead weight and decrease the proportion of paying load. Future development must undoubtedly come from the increased use of metal in car construction, by which it may be possible to further increase the paying load and decrease the percentage of dead weight.

The operative economy of large cars depends upon the extent to which they can be made to carry full loads. There is some difference in this respect between box cars and open cars. Open cars habitually carry full loads one way and move empty the other. Probably 46 per cent. of the open car mileage is empty car mileage. Covered cars oftener have return loads and probably not more than 20 per cent. of this movement is empty car mileage. It is estimated that of loaded covered cars (exclusive of strictly local traffic) about 85 per cent. are fully loaded and 15 per cent. will average nearly one-third of a full load. Taking the freight traffic of the country as a whole, about 25 per cent. of the total tonnage is of such a character that a full carload does not reach the limit of weight capacity. About 75 per cent. is of such a character that it may be loaded up to or beyond the full weight capacity of the cars. This 25 per cent. of light freight is mostly carried in covered cars. The bulky freight frequently, but not always, moves in small lots, and it is more difficult to get full carloads of this than of heavier freight.

The box car equipment, including refrigerator and furniture cars, is about 47 per cent.; the open cars are about 48 per cent., and stock cars about 5 per cent. of the total car equipment of the country. A greater number of covered cars is needed in proportion to tonnage, than of open cars, for the following reasons :

1. Because the average loads of the covered cars are lighter than of open cars.

2. Because the covered cars are delayed longer in unloading and loading, and are frequently held weeks and months for prospective return loading.

3. Because the covered cars are not confined exclusively to the light, bulky freight, but engage more or less in the movement of heavy freight.

The committee considers briefly the practicability of using light cars of small capacity, and naturally arrives at the conclusion that this is a question for each railroad to settle for itself according to its own conditions. The car question must be considered as a whole and with a view to free interchange. No economical reform can be more important than bringing about uniformity in dimensions and otherwise promoting interchangeability. This is one of the fruitful means of decreasing unproductive car mileage.

Operating economy demands that the number of tons of paying freight drawn by each engine shall be increased. This is a strong point in favor of the use of large capacity cars. The tendency of the future will be metal construction in cars of increased capacity concentrating the tonnage in fewer cars and shorter trains. Such an evolution will accomplish the following desirable results, viz. :

1. Reduce the friction and the atmospheric resistance.

2. Bring the moving load nearer to the engine, so that it can be more easily handled than in a long train.
3. Reduce the empty car movement in the direction contrary to the heavy traffic stream.
4. Reduce the number of cars and the number of locomotives for moving a given tonnage.
5. Reduce the switching service.
6. Reduce the payments for car mileage and the cost of inspection and repairs in proportion to the tonnage moved.
7. Increase the traffic capacity of main lines, of freight yards and terminals without building more main tracks and sidings.

From the traffic standpoint the use of large capacity cars has come from their effect on rates. Traffic officers have determined what, with respect to certain light and bulky articles, shall be considered a nominal minimum carload. In many cases this minimum is not what the ordinary box car will hold, but two or three times what can be put into it. Whether a given carload rate is considered by the shipper high or low depends upon the size of the car offered by the carrier. Hence an important competition among carriers has been developed in building extra large cars for handling light and bulky freight. The natural remedy for this seems to be establishing a rate unit for light and bulky articles that will make no discrimination between small and large capacity cars. This is a difficult matter. It has been proposed by traffic officers, and the proposition is now under consideration, to limit existing minimum carload weights to 34-ft. cars and to establish a sliding scale of minimum weights, increasing for cars over 34 ft. and decreasing for cars under 34 ft. upon the basis of the proportionate weights per foot as compared with 34-ft. cars. For instance, if the minimum carload weight for any article loaded in 34-ft. cars is 20,000 lbs. it is proposed to deduct 600 lbs. for each foot of length of car less than 34 ft., but not less than 30. It is proposed to add 600 lbs. for each foot of length of car more than 34 ft., actual weight to be charged for when in excessive minimum weight.

This sliding scale depends solely upon the varying lengths of cars. It does not take into consideration their cubic capacity. The committee is of the opinion that the basing unit of the sliding scale should be cubic capacity, as recommended by Commissioner J. F. Goddard, and the committee strongly urges upon the Master Car Builders' Association and the American Railway Association the passing of resolutions to provide for this. This would of course require stenciling the cubic capacity on the side of the car.

The subject is next approached from the standpoint of construction and maintenance. It is considered doubtful if a wooden car with wooden bolsters can be successfully built of more than 40,000 lbs. capacity. Cars of greater nominal capacity have been built, but the committee does not consider them satisfactory. The wooden bolsters are especially troublesome and the committee recommends that on cars of more than 30,000 lbs. capacity no wooden bolsters be used.

In framing, the practice varies greatly and guesswork seems to prevail very largely. It is the opinion of the committee that truss rods should be so proportioned that they are capable of carrying the whole of the static weight that would naturally fall on them, and that the upper framing should have sufficient strength to sustain the extra stresses in running; but in the attempt to increase the capacity of cars heavy strains on the body truss rods call for metal end sills; that is, another step toward iron or steel frames. For box-cars of 70,000 lbs. capacity the committee recommends the use of at least six truss rods of 1⅛ in. diameter dropping down from a point just beneath the flooring over the body bolsters. The king posts at the cross-tie timbers should stand at an angle so as to exactly bisect that formed by the horizontal and inclined portions of the truss rods. The cross-tie timbers should be braced to withstand the horizontal thrust of the king posts, and the sills should measure at least 5 in. × 9 in.

Thirty-six feet inside is considered the maximum length for wooden frames. Summing up this portion of the report the committee recommends that for cars of 60,000 lbs. capacity and over, it is best not to exceed a length of 36 ft. inside measurement; that the main dependence for the vertical strength of box cars should be placed in the truss rods; that steel bolsters should invariably be used, and that the side bearings should always have a clearance.

The old style 10-ton capacity box cars used 20 years ago had about 120 cu. ft. of storage capacity per ton of weight capacity. The present 30-ton box cars have about 65 cu. ft. of storage capacity per ton of weight capacity. Although the storage capacity has been increased 60 per cent. the weight capacity has been increased 200 per cent. The factor which should now determine with respect to ordinary box cars whether it is economically desirable to further increase their storage capacity is the relative proportion of full carloads of light, bulky freight and of heavy freight, which they usually carry. About 85 per cent. of all loaded box cars are fully loaded either to the limit of their cubic or of their tonnage capacity. No reliable figures are available to show what proportion of these contain light, bulky freight, and what proportion contain heavy freight. The committee believes that the load carried is quite as often limited by cubic capacity as by weight capacity.

The conclusion is, that to reduce empty car mileage of box cars in general interchange they should be adapted to handle either class of freight. This means doing away with the existing double standard of box cars, one for light freight and one for heavy freight and fixing on a single standard available for all classes of through freight. It follows that the storage capacity of ordinary box cars should be slightly increased and the building of special sizes of furniture or wagon cars should be stopped. Storage capacity may be increased by increasing the available cross-section or the length, or both. It is of the first importance to know what is the maximum cross-section of covered cars that can be used in general interchange; and second, having agreed upon a standard weight capacity for covered cars, to know what is the maximum length of span over which the moving load can be supported.

An appendix gives the maximum clearance dimensions on various roads. [This table we shall not reprint, but it can be easily obtained from the Secretary of the club, Mr. W. G. Wattson, Superintendent West Shore Railroad.] From a study of this table the committee concludes that the maximum outside cross-section of cars should in no case exceed 12 ft. 3 in. from rail to top of eaves and 9 ft. 10 in. width from out to out. With respect to length some roads, notably the Pennsylvania lines, specify not to exceed 43 ft. out to out of platform and 31 ft. center to center of trucks. The committee does not recommend these dimensions as standard, but submits the figures for information. There are a few roads that are unable to handle cars of these maximum dimensions.

The committee is of the opinion that the proposed standard car body should have an available inside cross-section of 65 sq. ft. minimum, 75 sq. ft. maximum, and inside length of 34 ft. minimum and 36 ft. maximum.

The withdrawal from interchange service of all four-wheeled cars and of all eight-wheeled cars of less than 40,000 lbs. capacity would not be an injustice to any road, and with respect to roofed cars whose capacity is a factor of consequence, the additional line for exclusion from interchange might be drawn at cars of less than 30 ft. length inside and at storage capacity of less than 1,500 cu. ft. A suitable rule to this effect should be added to the Master Car Builders' Rules of Interchange. Furthermore the committee recommends that the maximum weight limits should be fixed at 70,000 lbs. capacity for roofed cars and 80,000 lbs. for open cars.

The committee prints a part of a table from the paper by Mr. Theodore Cooper to be found in the Transactions of the American Society of Civil Engineers, February, 1894, showing the percentage of freight of different kinds carried by a number of the most important railroads.

Over 30 pages of the pamphlet are given up to the replies of various correspondents to the circular of the committee. A part of this we shall print in a later issue.

Cast Steel Bolsters.

The Shickle Harrison & Howard Iron Company, of St. Louis, Mo., is making cast steel bolsters for both trucks and cars, that have given excellent results, both in tests and in service. The results of tests on one of their bolsters were given in the *Railroad Gazette* of Dec. 13, 1895, page 831. The general design of their bolsters is in the form of an I-beam, the construction being such as to throw the entire strain as far as possible on the top and bottom flanges, getting its greatest strength out of the material. They are designed to carry in service 100,000 lbs. apiece or 200,000 lbs. per car and the tests have shown how well the design has succeeded.

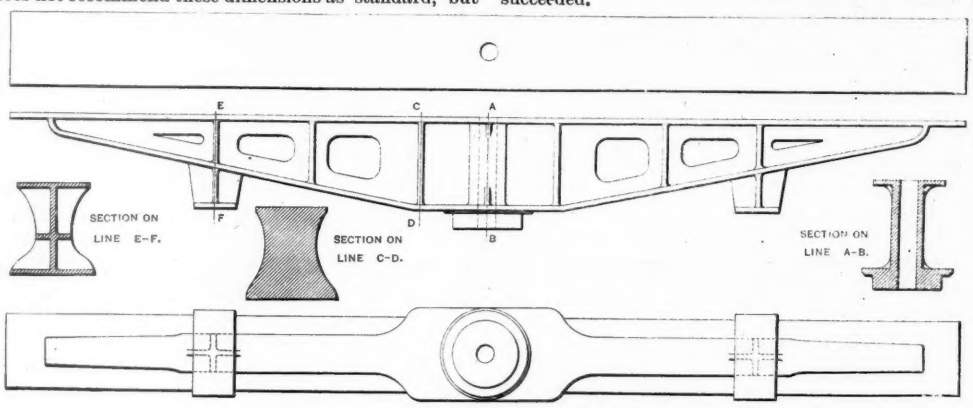
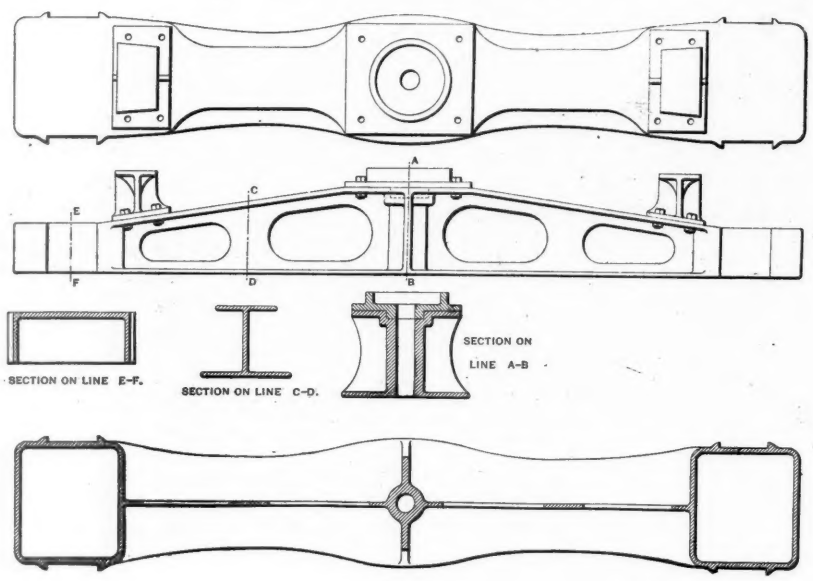


Fig. 2.—Cast Steel, I-Beam Body Bolster.



Horizontal Section.

Fig. 1.—Cast Steel, I-Beam Truck Bolster.

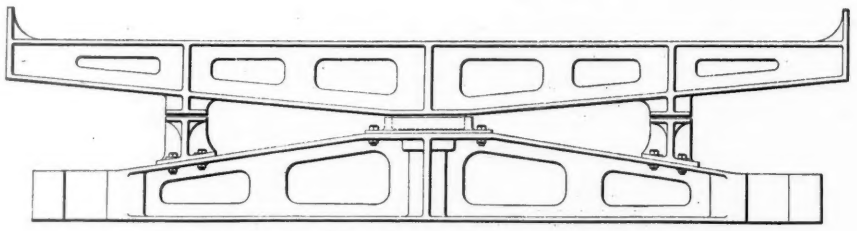


Fig. 3.—Cast Steel, I-Beam, Body and Truck Bolster.

Their truck bolster is shown in Fig. 1, which gives plan, elevation and several sections. It consists of a top and bottom flange, or compression and tension members, united by a web which is cut out in places for lightness. The ends where the springs are placed are recessed about 5 in., which enables the insertion of a block of oak above the spring cap to adjust the bolster to any desired height. It also permits the use of longer springs which will make the car ride easier. The side bearings and the center plate are cast separate from the bolster proper as these are the parts wherein is the widest difference on different roads. This also permits these parts to be replaced easily. It will also be noticed from the sections that the center plate is let into the bolster, thus relieving a great deal of the strain on the bolts. The compression member is also sloped down to the sides, giving it the correct shape to carry the load best.

Fig. 2 shows one of the first body bolsters made. The general construction, that is I-beam section, does not differ materially from the truck bolster. In this case, however, the tension member is the top flange, and the compression member the bottom one. The center plate

and side bearings are integral with the bolster. On each side of the king bolt are openings to permit the extension of the draft timbers through the bolster. This feature, however, is not always required, and a bolster has been more lately designed, in which these openings were abolished.

This later bolster is given in Fig. 3, which also shows the truck bolster in position. The shape of the ends of both designs of body bolsters was optional with the railroad company ordering them.

Testing the B. & O. Electric Locomotive.*

The electric locomotives built for the Baltimore & Ohio by the General Electric Co., are now used in the Belt Line tunnel under the city of Baltimore, for freight service only. As the conditions for operating the passenger trains entirely by the electric locomotive could not, on account of track facilities, be perfected until the new Mount Royal station, at the northern portal of the tunnel, was completed, it was decided to operate them in the meanwhile by coke burning steam locomotives. The new station will be ready in April or before, and preparations are now being made to then operate all trains, both freight and passenger, by the electric locomotives.

It was shown, from the few trials made with passenger trains, that not only could the guaranteed speed of 30 miles an hour be attained, but speeds of 35 and 40 miles, with 500 ton trains, were possible. An exhibition of high speed was made with the locomotive running light up the 0.8 per cent. grade, and a speed of 61 miles per hour was attained for a short time, without the slightest trouble from trolley or motors. Probably the most striking was when two trains were coupled together and hauled through the tunnel. The train consisted of 44 cars, loaded with coal and lumber, two regular freight engines and a "pusher" engine. The whole weight was approximately 1,900 tons, and was equivalent to about 52 loaded cars. The steam locomotive did no work. The start was made easily and gradually, but when the train was in the tunnel and entirely on the grade the steady, heavy pull was too sévere on a defective coupling near the head of the train, and it parted After coupling together again, the electric locomotive started the heavy train, with all drawbars stretched, and easily attained a speed of 12 miles an hour. The current recorded on the ammeter was about 2,200 amperes during the acceleration period, and after the train was up to speed it settled down to about 1,800 amperes. The voltage on the line was 625. By reading the amperes we were able to readily compute the drawbar pull, and found it to be about 63,000 lbs. All four motors were in series, giving, therefore, the maximum pull for that current.

The drawbar pull exerted for each ampere of current put into the locomotive was determined as follows: The Pennsylvania Railroad Company's dynamometer car was secured and coupled in between the electric locomotive and a train of known weight. The weight of each

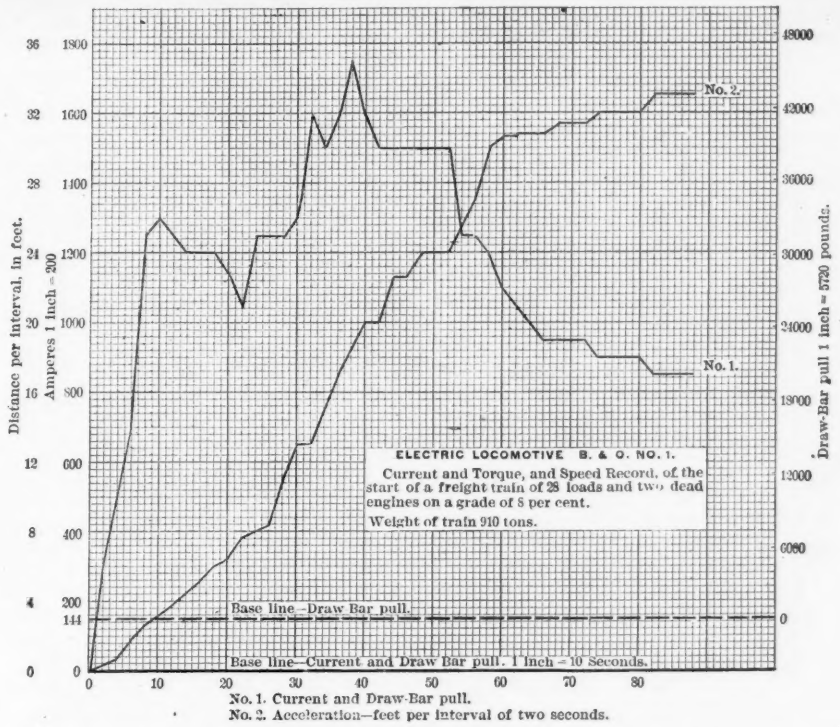

Distance per interval, in feet.
Amperes 1 inch = 200
Draw-Bar pull 1 inch = 5720 pounds.
No. 2.
No. 1.
ELECTRIC LOCOMOTIVE B. & O. NO. 1.
Current and Torque, and Speed Record, of the start of a freight train of 28 loads and two dead engines on a grade of 5 per cent.
Weight of train 910 tons.
Base line—Draw Bar pull.
Base line—Current and Draw Bar pull. 1 inch = 10 Seconds.
No. 1. Current and Draw-Bar pull.
No. 2. Acceleration—feet per interval of two seconds.

Fig. 2.—Current and Acceleration Curves from Baltimore & Ohio Electric Locomotive.

proportional to that of the train. An irregular line marked No. 2, above the base line, was the planimeter record, from which was determined the mean pull for any time. Having, then, the velocity, or the feet per minute and the mean pounds pull exerted during any period, we readily obtained the horse-power developed.

Another line on the diagram showed the chronograph record, each of the small offsets in the line occurring every five seconds. For every hundred feet the train moved, the paper moved an inch. The distance in inches between any two of these offsets gave us readily the velocity of the train. Another line represented the time readings of current and voltage which were taken in the locomotive, a push-button in the locomotive being electrically connected with this recording apparatus. These readings were numbered, so it was easy to tell the current at any time and location. Still another line showed a record of the different stations in the tunnel. From this we determined the location of the train at any time.

The first test showed (*a*) how the start was made on the down grade leading to the tunnel; (*b*) how after the train was fully started, the drawbar pull dropped off; then (*c*) how it gradually increased as the train came on to the

Test No. 2 was made after we had switched off six cars. The run was made under similar conditions and the same character of observations were made. The difference in drawbar pull of the two trains would naturally be the drawbar pull necessary for the six cars switched off. We had their exect weight and were thus again able to find what the drawbar pull per ton was. It was a check on our first figure and was very close to it, the slight difference we found being due to one brake on the six cars being partially set during the first run and unknown to any one.

We had the readings of current during the first run, also during the second. The difference of these should show the current required to haul the six cars switched off. Dividing the difference in the drawbar pulls recorded in the two tests by the difference in current recorded gives us directly the net drawbar pull in pounds per ampere of current. This was 28.6 lbs.

It will, of course, be noted that by this method we eliminated the current required to drive the locomotive. To determtne how much this was, and to check our conclusions, we divided the drawbar pull in pounds recorded in the first test by 28.6 and thus obtained the current that should exert that net drawbar pull. Subtracting

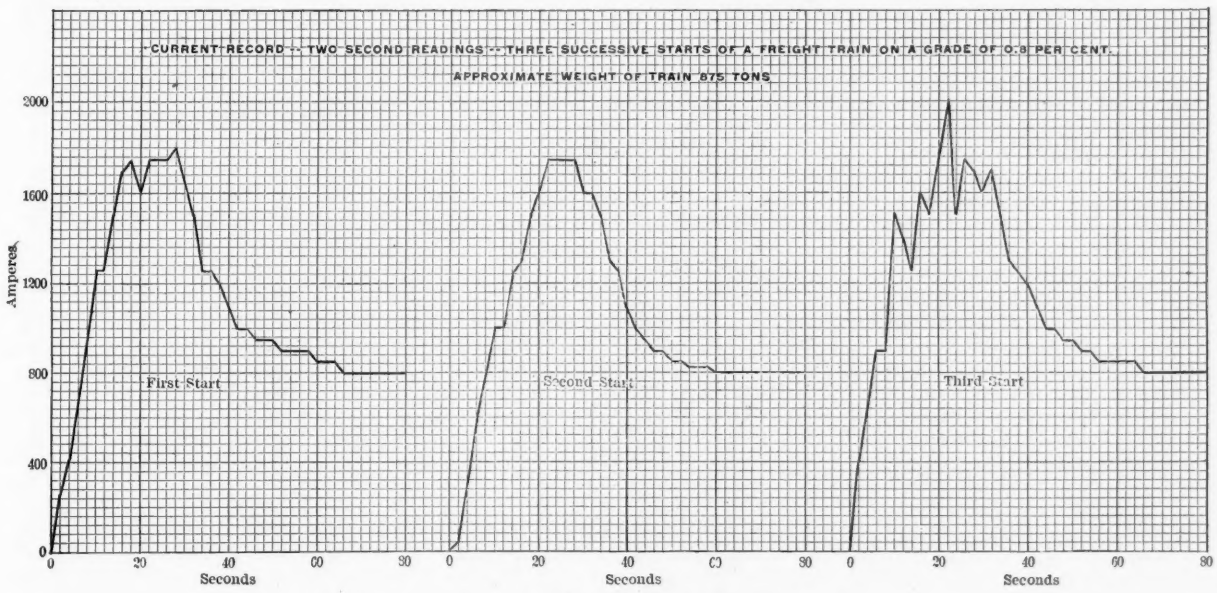


Fig. 1.—Current Records from Baltimore & Ohio Electric Locomotive.

car in pounds had been accurately determined beforehand. The regular two-mile haul up grade was then made. When the train was in the tunnel on the grade the pull was uniform, as was shown in the diagrams taken on the dynamometer car.

When no drawbar pull was recorded the pen rested on base line No. 1. The height or ordinate of the irregular curve at any point represented the drawbar pull at that instant. Measuring the same in inches and subtracting a constant and then multiplying by 4.000, gave the drawbar pull in pounds, *i. e.*, every inch in height represented 4,000 lbs. The paper traveled under the pen at a rate

* Extracts from an article on "Experience with the Electric Locomotive in Baltimore," by Lee H. Parker, engineer in charge of the electric installation for the B. & O. Belt Line Tunnel, at Baltimore.

0.8 per cent. grade in the tunnel; and (*d*) after the train was wholly on the grade, how even the pull was, until near the stop, when the grade increases to 1.2 per cent.

From test No. 1 we obtained the total drawbar pull in pounds, and, knowing the weight of train, we found the drawbar pull to be 22 + pounds per ton of weight. Subtracting the grade pull which, in the case of an 0.8 per cent. grade, is 16 lbs., we obtained 6 + pounds per ton as the train resistance. This confirms the usual allowances made for freight train resistance. These observations were taken in September, 1895, on a very hot day. During the past winter months the train resistance has increased, due, no doubt, to greater journal friction caused by thickened lubricants, and we find it to be from our records about 20 per cent. to 30 per cent. greater than in September.

this current from the current actually recorded on the locomotive would give the current required to drive the locomotive. We found it took 144 amperes. As a further check we figured similarly for the second test, and obtained precisely the same, *i. e.*, 144 amperes. So at any time now, when hauling a train with the four motors in series, if we take the current indicated on the amperemeter and subtract the 144 amperes needed for the locomotive, and multiply the remainder by 28.6, we have the total net drawbar pull in pounds, and if we divide this by the drawbar pull per ton we get the tons of load we are pulling.

From the results obtained above we were able to show the current and drawbar pull at any moment while accelerating a train. The curves (Figs. 1 and 2) explain themselves very fully.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The report that Mr. Hays, the new general manager of the Grand Trunk Railway of Canada, had largely increased that company's stock of passenger cars by converting to that use a fabulous number of officers' cars which he found had been instruments of great extravagance, has dwindled to the modest statement that, certain offices west of Detroit having been virtually abolished, and their duties consolidated with those of other men at Montreal. the officers' cars had also been abandoned. The item is significant, nevertheless, for it shows that Mr. Hays, in the numerous changes that he is making, does not overlook the element of economy in this feature of the business. An official car is often a necessity, if an officer is to do a reasonable amount of work. It pays to give him a place where he can write and eat and sleep, and where he can talk with the local officers as he journeys along; and it may well be said that an officer who abuses a private car is not fit to keep on the road. Still, there are very good reasons why he should not be tempted to do all of his traveling under special conditions. Under an order like that which President Ripley is said to have issued on the Atchison, "That officials who ride in private cars must observe the strictest economy, and that under no circumstances shall private cars be used except for business," it may often be necessary to ride in a day car —or a baggage car - until nine o'clock in the evening and then sleep at a hotel, when it would be more comfortable to order out " my car " and sleep in a familiar bed. We are reminded of the rule prescribed years ago by Charles Paine, that the division superintendent should always when possible ride at least one way (on every trip over his division) on the local freight. Time thus spent is not always wasted, even if the caboose rides too roughly to permit of writing and one has nothing to read. Some division superintendents would not be slandered if we accused them of spending too little time in meditation. Another general manager, speaking on this subject recently, alluded to the importance of keeping track of " what the traveling public has to put up with," on your road. The division superintendent who always rides in his official car may come to be out of sympathy with passengers who complain of poorly ventilated or dirty cars, careless trainmen, or uncouth newsboys.

The British Railway Commission has just given judgment in two actions brought under the act of 1894 against railroad companies for unreasonably increasing their charges. In one case the railroad company (the North Eastern) was entirely successful; in the second, the company (the London & North Western) was beaten on all the main issues. From the two judgments it appears evident that the Commissioners regard themselves as constrained by the act of Parliament under which they work to give effect to what they must unquestionably recognize as a serious economic fallacy. Admitted the company's expenses have increased, and that the company is accordingly justified in seeking increased receipts to counterbalance them, it is apparently shut up to obtain those receipts only from the identical traffic which causes the increased expenditures. It may be the extra expenditure is on coal traffic, and that increased rates on coal will check the development of the country; while the same money could be obtained by higher charges for carrying silks or velvets, on which the difference of rate would be scarcely perceptible. According to the Commissioners' interpretation of the act of Parliament, any such attempt to avoid burdening articles of prime economic necessity would be simply illegal. The Commissioners do, however, apparently recognize as a ground for increasing a rate to-day the fact that it was unduly and unreasonably low before. But in the case in which this point came up it was only a by-issue, and it will doubtless be more carefully considered on a future occasion.

The Baltimore & Ohio Receivership.

The Baltimore & Ohio passed into the control of two receivers on Saturday last. The weakness of its finances for years, and, specifically, the heavy burden of debt which the company was attempting to carry, have been well known, so that insolvency had been pretty well discounted among all interests which could be affected. The officers had stated, up to the day before the receivers were appointed, that the company could arrange for funds to meet its immediate necessities. There appears to have been ground for this belief. But, as in many another similar crisis, it was found at the last moment that negotiations could not be completed. Just why the aspect of affairs changed so suddenly remains unexplained, and, it may be said, an unfavorable feature of Baltimore & Ohio history has been mystery and the blindness of its accounts.

The immediate cause of the company's embarrassment was the inability of the directors to raise about $400,000 to meet interest payments on March 1. The directors, having failed in their efforts to make a collateral trust loan, and no other method of prompt relief being available, there was no recourse to preserve the property but to apply to the courts.

But the cause of the downfall of the company, back of this default in payment of interest, appears very plain. It was, in brief, large and constant increases in capital and fixed charges, with no improvement in earning ability. The charge has been made against the company that for years it has been paying unearned dividends. After the financial reorganization in 1888, the dividends on the common stock were suspended for several years. The stock dividend of 20 per cent. was declared in 1891. The next year cash dividends were resumed on the increased capitalization, and 3½ per cent. was paid in that year, five per cent. in 1893 and 4½ per cent. in 1894 No dividends were paid in 1895.

The gross earnings of the company in 1889, the year in which Mr. Mayer became President, were $21,303,002 and they have continued at about that figure each succeeding year, except in the exceptional year of 1893, when they were above $26,200,000. (The Baltimore & Ohio profited largely by the World's Fair travel). In 1895 the gross earnings were but $22,817,182. So that the addition of the Pittsburgh & Western and other lines to the system in the last seven years, and the new capital, have been followed by no material change in earning power. The ton mileage in 1889 was 2,340,730,503 and in 1895 it was 2,470,822,808. Allowance is to be made for the proportion of the increase represented in these figures which was secured by the addition of 304 miles to the operated mileage, which is now 2,095. Taking the ton mileage figures, for the main stem, we find that they were 1,181,674,217 in 1889, and 1,287,868,982 in 1895. The increased ton mileage on all lines in the seven years has, therefore been only 130,092,306, of which 106,194,765 is due to the operations of the main stem, the mileage of which remained practically unchanged.

At what cost has this increase of traffic been obtained? A comparison of the balance sheets of 1889 and 1895 shows an increase of over $6,677,000 in securities owned; $3,404,000 advanced to operated lines; $5,830,000 increase in other items and $8,500,000 expenses for terminals, the various items footing up about $25,000,000.

The manner of keeping the accounts of the Baltimore & Ohio makes it impossible to arrive at an independent conclusion of the value of these assets from any figures given in the report. It seems very likely that a large part of them ought to be written off. The terminal bonds were chiefly for the Baltimore tunnel, which has cost the company much more than the original estimates and more than it will be worth to the company for many years to come. Many of the lines to which the advances noted, were made are operated at a loss and how much the company may ever be reimbursed is a matter of much doubt.

Some questions of much interest relating to the company's financial management, which were passed over in the annual report, issued in November last, have been made public since the receivership. The most important is the statement that, about a year ago, $1,000,000 of the company's holdings of Western Union Stock was sold. This stock was acquired in 1888, when the company's telegraph line was sold to the Western Union The railroad received $5,000,000 of telegraph stock, which it was understood it still owned. It has received a large income from this stock.

A statement published on Tuesday, and said to be authoritative, gave the floating debt of the Baltimore & Ohio "proper" as about $3,000,000, and including amounts for which the company was liable, about $12,000,000. It was said that the Receivers estimate that the company needs $20,000,000 to pay off these debts and to provide working capital. The issue of Receivers' certificates to provide new rolling stock is being discussed.

An investigation of the company's books is now being made by Mr. Stephen Little for the New York security holders. It is not known whether this report will be published, but of course the only just course for the Receivers to pursue is to give the fullest information to every security holder, large or small.

For many months the stock exchange values of the securities of the company, have been falling. The downward movement became marked in September and has been almost continuous since then. The annual report issued in November, was subjected to much criticism on account of the little information it gave as to the company's condition. In the last few months the sales of stock have been large, and the loss in market values extreme. In September the common stock sold at 66¼, in January at 42, and just before the receivership was announced the quotation was 22. This week the stock has declined to 16½. The preferred stocks are not largely dealt in on the stock exchanges, but the bonds have suffered heavy losses in market quotations. The five per cent. bonds due in 1988 quoted in November at 115 are now selling for 91. The five per cent. bonds of 1925 formerly quoted at about 113 now sell at 83.

This is the first receivership in the long history of the Baltimore & Ohio, and its charter dates back to 1827. A year later construction work began. But, as is well known, this is not the first time that the company has been in serious financial troubles. In 1888 when its finances were reorganized Mr. Samuel Spencer was elected President. He retained the management only a year, but inaugurated a policy which had admirable results during his term, and, if carried out, would have kept the Baltimore & Ohio a prosperous property. One result of that year's management was the disappearance of the remarkable "surplus fund" which had figured in the company's annual reports for many years. In 1887 it had been reported as $48,083,720. In the report issued by Mr. Spencer it reduced to $23,812,606, and made a credit to profit and loss instead of a "surplus fund." That annual report was the most clear and complete ever issued by the company.

Some of the Burdens of the Railroads.

Perhaps it is not entirely useless to call attention from time to time to the extraordinary oppression which railroad owners and the employees of railroads have to endure, largely as the result of bad laws. Those who get their incomes, or who used to get their incomes, from money invested in railroad securities do not need to be reminded of the serious decline in available net earnings which has been in progress for a good while. Those who live on the wages paid out by railroads, and those who depend less directly upon these wages, ought to have the situation kept before them so persistently that they will by-and-bye realize that there is another side to this question of forcing down rates and forcing up taxes.

A couple of months ago we called attention to the great falling off in the number of men employed by the railroads in 1894 as compared with 1893. From the returns of the Interstate Commerce Commission, it appears that in 1894 there were about 94,000 fewer railroad employees than in the year before. There were less, in fact, than there were in 1891. Of course the universal hard times had much to do with this, but the impossibility of maintaining rates under the laws as existing, and as interpreted, probably had quite as much to do with the necessity for reducing expenses by discharging men and by cutting wages.

We have recently had occasion to look into this matter from another side; that is, to observe the increase in receiverships since the Interstate Com-

merce law went into effect. At the end of 1886 the total mileage of railroads in the United States was about 138,000, and the miles in the hands of receivers were a little over 9,000; that is, 6½ per cent. of the railroad mileage of the United States was then in the hands of receivers. June 30, 1894, there were, according to the Statistician of the Interstate Commerce Commission, about 179,000 miles of railroad in the United States, and 41,000 miles, in round numbers, were in the hands of receivers. The percentage had risen from 6½ to 23, as measured by mileage. The Statistician of the Commission says that the total capitalization of roads in the hands of receivers was about $2,500,000,000, or one-fourth the total railroad capitalization of the country. He adds: "This is a record of insolvency without parallel in the previous history of American railroads, except it be in the period from 1838 to 1842." He attributes this extraordinary situation to the business depression, as we suppose he feels officially obliged to do. We take the liberty of suggesting that if the railroads could have maintained living rates, even with the diminished volume of traffic carried during the period of greatest depression, a great deal of the suffering which the above figures suggest would have been avoided.

But it is not alone that the railroads are prevented by law from getting reasonable rates. They are seriously discriminated against in other particulars. We printed last week some extracts from the remarks of Mr. Blackstone, President of the Chicago & Alton Railroad, which are worth further attention. He shows that in the state of Illinois the assessed valuation of all property except railroads fell off 15½ per cent., although in the 19 years the actual increase in the value of all kinds of property but railroads was very great. But the railroad property in the state was assessed in 1877 at $37,141,000, and in 1895 at $79,231,000. The increase in railroad mileage during the period was 47 per cent. The increase in net earnings was a fraction less than 40 per cent., and the increase in assessment for the purpose of taxation was 113.56 per cent. Meantime the valuation for taxing of all other property in the state had been reduced 15½ per cent.

The taxes paid in 1894 by the Illinois railroads amounted to a sum equal to 77.43 per cent. of the total amount of dividends earned in the state by all those companies. But notwithstanding the heavy burden of taxation imposed upon the railroads and notwithstanding that 36 companies operating railroads in the state failed to earn their fixed charges, the Railroad Commissioners issued an order requiring all of these companies to reduce their rates for transporting freight to conform to a new schedule and classification which has been in force since the first day of last July.

But in this matter of disproportionate increase of taxation the railroads of the United States do not seem to be alone. In England we are told that the proportion of local taxes paid by the railroad companies is increasing with startling rapidity. For instance, in one parish in Surrey the South Eastern Railway occupies 1.26 per cent. of the land and pays 76 per cent. of the taxes. On the Great Northern there are over 50 parishes in which the company pays 56 per cent. of the local taxes, and in some instances its percentage goes up to 84 per cent. On the North Western there are three parishes in which the company has nothing but its lines, without any buildings whatever, and yet pays more than 80 per cent. of the local taxes. In 21 parishes the company occupies from 0.8 to 5 6 per cent. of the land, and pays from 62 to 87.7 per cent. of the taxes.

The English-speaking people are still deeply devoted to that great idea which has been the very foundation of their liberty and of their marvelous growth, the idea of letting the subject alone to work in his own way, so long as he lets his neighbor alone. But they are in danger of forgetting, for a time, that the owner of a railroad is also a subject, with a right to life, liberty and the pursuit of happiness.

Discipline on the Louisville & Nashville.

In disciplining a large number of men, as on a railroad, one of the most unsatisfactory circumstances is the impossibility of giving specific credit for meriotorious deeds or conduct. This difficulty has forced itself upon the attention of those who investigated the methods of Mr. Brown, of the Fall Brook Railway. His scheme of "discipline without suspension" has been copied more or less closely by a number of roads, but until now none, we believe, has undertaken to systematically record anything but demerits. Merits are harder to deal with. The specimen "merits" published in these columns October 25 last (page 706) indicate very clearly that a man might work a dozen years before getting his name on any roll of honor such as the one there referred to.

But the Louisville & Nashville, which adopted the Fall Brook plan on June 1 on two divisions, and has lately extended it to two others, the South & North Alabama and the Birmingham Mineral, has adopted a definite scheme of "credits" as follows:

First. A suspension of 15 days* or less charged against an employee will be considered canceled by a perfect record for one year.
Second. A suspension of more than 15 and not to exceed 30 days will be considered cleared by a perfect record for two years.
Third. Suspensions amounting to more than 30 days and not to exceed 60 days will require three years' clear record for their cancellation.
Fourth. Suspensions in excess of 60 days, occurring in a period of one year, will call for the special condsideration of the board [of superintendents].
Fifth. A complimentary bulletin will be issued every 12 months in the prescribed manner, giving employees who have a perfect record for one year a special credit.
Sixth. Acts of heroism and loyalty will call for special mention and consideration by the board.

In passing, we may note that Mr. Brown employs one of the most taking "credits" that we know of; he pays $60 at the end of the year to each freight conductor who has made a clear record for 12 months. This, indeed, was the prominent feature of the Fall Brook's practice, which first led us to recommend it to our readers in 1887. We are glad to have our advice followed, even after eight or nine years, but we have not yet heard that any one has very enthusiastically followed this part of it A road in far-away Washington paid some premiums in 1890, but it paid too many of them, or too large ones, or for some reason it failed to make both ends meet, and it was swallowed up by a big road managed 3,000 miles away; and premiums to men for individual efficiency do not greatly flourish where the employer is that distance from the employee.

The L. & N. credit plan strikes us as commendable. The terms named may not be equitable, but the number of months or years necessary to establish a certain degree of merit is a factor that can readily be changed. In fact, the committee-report dealing with the subject states that this point is not to be regarded as unalterably fixed.

The Superintendent of Transportation of the Louisville & Nashville, Mr. G. E. Evans, had the work of the committee of officers which investigated this subject set forth in a 15-page pamphlet, which was sent to all officers of the road who are in any way interested in discipline. In this way he made sure that the new arrangements, with the views of the General Manager and himself concerning them, were well and uniformly understood on all divisions of the road. This pamphlet contains the conclusions of the Superintendents who visited their neighbor, Mr. Darlington, of the Pennsylvania, to learn the details of his experience (suspensions were abolished on Mr. Darlington's division June 1, 1894), and a brief essay by Mr. Evans. The results of five months' trial on two divisions of the Louisville & Nashville are summarized as follows:

The L. C. & L. Division has subject to this discipline 36 conductors, 98 brakemen, 10 baggagemen, 45 enginemen, and 45 firemen, or a total of 234 men. One employee in train service has been discharged. His dismissal would have resulted under the old system. There have been 20 cases of discipline, affecting 16 men. Twelve men have been nominally suspended once, and four men twice, as follows:
Nine [passenger] conductors were suspended for honoring posted passes.
Two conductors for getting left.
One conductor for careless loading of local freight.
One conductor for failing to make proper effort to place derailed cars on track.
One conductor for failing to regard Rule 89 [10-minute interval between trains], thereby causing collision.
One engineman for failing to regard Rule 89, thereby causing collision.
One brakeman for violation of Rule 152 [to prevent sliding of wheels].
One brakeman for careless handling of switch, causing derailment.
One engineman for failing to report defect in engine.
One engineman for failing to obey special time-table rule.
One fireman for failing to respond to call.
No more than two offenses are charged against any one man, though one of the men with two charges against him is now under investigation for failing to obey the second paragraph of Rule 150 [prohibiting too much riding in caboose in cold weather], and it is probable that he will be recommended for dismissal, as both of the charges already against him are for serious offenses. The engineman and conductor who violated Rule 89, causing a rear end collision, were given a nominal suspension of 60 days. They would have been discharged, but for the almost spotless record of the engineman, who is one of the best men on the division. The accident for which they were disciplined occurred very shortly after the new system was established.

In the 20 cases of discipline mentioned, the wages saved to employees amounted to $1,067:

11	Passenger conductors	115 days	suspension	$365
3	Freight "	55 "	"	155
2	Brakemen	25 "	"	45
3	Enginemen	109 "	"	470
1	Fireman	15 "	"	32
	Total			$1,067

*"Days" and "Suspension" are used as arbitrary terms; the employees are not suspended.

The Kentucky Central Division has subject to this discipline 37 enginemen, 37 firemen, 33 conductors, 90 brakemen and baggagemen, 8 yardmen, and 2 hostlers, total 207. There have been 11 cases of discipline, as follows:
One engineman stopped too soon after train broke in two.
One engineman stopped too soon after train broke in three.
One baggageman failed to put off mail.
One brakeman failed to fasten pin in switch lever.
One brakeman signaled to come ahead before switch was thrown.
One brakeman left coach on siding so as not to clear.
One engineman failed to notice brakeman's signal.
One fireman failed to notice open switch.
One hostler not looking out and not keeping engine under control in yard, causing collision.
One engineman not having engine under control in yard and causing collision.
One brakeman setting brakes with stick.
In the 11 cases the wages saved to employees amounted to $601, as follows:

4	Enginemen	110 days suspension	$440
1	Fireman	10 "	21
1	Baggageman	7 "	12
4	Brakemen	42 "	98
1	Hostler	30 "	30
	Total		$601

The report concludes:

"A good feature of the new system is found to be the reduced number of extra men employed, and the less frequent changes as compared with the old plan. It may also be mentioned that under this system an officer taking charge of a division can readily acquaint himself with the full record of each employee. This is an advantage to employees with a good record, as well as to the officer.

"The committee is of the opinion that this form of discipline has so far proved to be to the company's interest. It certainly imposes no hardships upon the employees subject to it and we believe it has appealed to their pride. . . . The plan has aroused great interest among the men and they watch the bulletin cases and discuss each new bulletin. . . . Many of the employees are as yet, as they are with all new regulations, somewhat afraid that they may in the end be the sufferers, and in some cases of discipline they have expressed a preference for actual suspension, as there is a feeling that in serving a suspension they pay the company for its loss caused by their neglect. It is believed, however, that a further trial of the system will enable them to better understand its workings and the position of the company toward them. . . .".

Annual Reports.

Pennsylvania.—The report of President Roberts, giving a general summary of the results of operation for the year 1895 has been issued. Following the usual custom of the company it has been issued some days in advance of the stockholders' meeting. This year the report was published on March 3, not only in pamphlet form, but in the newspapers of Philadelphia and New York City. The stockholders' meeting occurs on March 10. The figures presented reach totals which cannot be approached by any other railroad in this country. The gross earnings on all lines east and west of Pittsburg were over 132 million dollars, an increase of nearly 11 millions as compared with the previous year. The net earnings were nearly 40 million dollars, being an increase of about 3 millions over 1894, although several millions were spent for maintenance and improvements.

The report now issued is confined to summarizing the financial results of the year, the improvements to the road made during the last year, and to comment on certain questions of policy. The general balance sheet is also given. The General Manager's report, with its detailed operating statistics, comes out later.

President Roberts thinks that, in view of the fact that the low rates of the past few years on both passenger and freight traffic continued during 1895, the results of the year are very gratifying, the company having carried to profit and loss account more than $2,000,000 after paying five per cent. dividends, and expending $1,300,000 on improvements east of Pittsburgh. This result, he says, proves that the property will continue to make fair returns to shareholders under any reasonable conditions.

The chief results of operation for the three grand divisions east of Pittsburgh and Erie, embracing the main line, United Railroads of New Jersey, and the Philadelphia & Erie, and branches, were:

	1895.	1894.	Inc. or dec.
Gross earn.	$64,627,179	$58,704 234	I. $5,922,894
Oper. exp.	44,510,656	40,363,746	I. 4,146,910
Net earn.	$20,116,522	$18,340,538	I. $1,775,984
Int. and rentals	5,063,460	5,513,195	D. 449,735
Total income	$25,179,983	$23,853.733	I. $1,326,249
Fixed charges	14,649,550	14,383,613	I. 265,937
Net income	$10,530,432	$9,470,120	I. $1,060,312
Deduct sinking and trust funds $563,712) and extraordinary renewals, etc. ($1,327,251)	1,895,962	2,110,373	D. 214,410
Bal. for dividends	$8,634,470	$7,359,747	I. $1,274,722
Dividends 5 p. c.	6,465,011	6,464,648	I. 363
Profit and loss	$2,169,459	$895,099	I. $1,274,359
Surplus Jan. 1, 1895.	23,155,632	26,178,152	D. 3,322,520
Surplus Jan. 1, 1896.	$25,325,091	$.7,373,251	D. $2,048,161
*Deduct miscellaneous items	1,771,621	4,217,620	D. 2,445,999
Balance to credit profit and loss	$23,553,470	$23,155,632	I. $397.837

*In 1894 this deduction was amount charged off in adjustment of advances made under lease of the United New Jersey Railroads and the Philadelphia & Trenton Railroad, for construction and real estate expenditures, less amount received in settlement of sundry accounts. In 1895 it was the amount of interest on funded debt accrued to Jan. 1, 1896, but not yet matured, less amount due from investments on same date, also amount charged off in reduction of value of securities and settlement of sundry accounts.

During the year the expenditures for the main line and branches charged to capital account were $607,859, this sum being entirely for additional freight cars and real estate. All other extraordinary outlays were charged against general income. The amount spent for construction on branch and auxiliary lines was $1,936,741. During the year orders were given for building 8,000 cars, many of which have been delivered. The principal improvements on the branch and auxiliary lines included in the expenditures noted above were the extension of the double track on the Pittsburgh, Virginia & Charleston, the extension of the Fairhill road in the northern part of Philadelphia to give increased facilities for local freight traffic; and the construction of the Delaware River bridge, near Frankford, Philadelphia. The purposes of this structure have been previously explained. The bridge is now nearing completion, and will be ready for business early in the summer. The elevation of the tracks in Elizabeth, N. J., is now finished except for one bridge. "The policy of eliminating grade crossings by the construction of overhead or under grade bridges is being continued wherever it can be done with a due regard for economy and the local authorities properly co-operate toward reaching this result." Reference is also made to the important changes on the main line involving revisions of location, which were placed under contract in November last. These improvements were described in the *Railroad Gazette* of Dec. 6, 1895, p. 808. The contracts include the straightening of about five miles of the Philadelphia Division, near Kinzers; a change of location in Mt. Joy, Pa., eliminating all grade crossings and improving the alignment west of the town; two important changes on the Pittsburgh Division on the western slope of the Allegheny Mountains, one change involving the rebuilding of five miles of road to secure a practically straight line between Lilly and Portage. The estimated cost of the work on this one section is $700,000. The other change on the same division is near Greensburg, where a revision of the line is being made and a new tunnel half a mile in length constructed. These improvements will require an outlay of nearly $2,000,000.

The funded debt of the company is now $87,658,911, an increase of $4,902,675 over 1894. The large increase in 1895 was due to the issue of 3½ per cent. sterling bonds amounting to $4,850,000. President Roberts congratulates the stockholders that these bonds were placed at a lower rate of interest than the company has ever before been able to secure, which he regards as gratifying evidence of the high credit enjoyed by the company. It is needless to add that few if any other American railroad bonds have been sold at such a favorable rate of interest. The funds secured by the sale of these bonds are to be used for construction and equipment purposes, and to retire bonds of subsidiary corporations which will shortly become due, the company taking advantage of favorable conditions in the money market to sell the issue in July last.

The cost to the company of the securities of other corporations which it now holds, has been over $118,000,000. The revenue received from them in the year was $4,353,987, which was more than sufficient to pay the interest on the funded debt, amounting, as shown above, to $4,163,000. The income received from these investments was about $265,000 less than in 1894. The interest, however, from these investments in 1895 was nearly four per cent. on their cost. No additional car trust certificates were issued during the year. The certificates outstanding on Dec. 31 amounted to $5,532,000. The number of cars provided on the car trust system is 57,997.

Few traffic statistics are given in this preliminary report. The number of tons of freight moved on the three grand divisions east of Pittsburgh and Erie in 1895 was 78,259,526, an increase of 13,581,832, or 21.00 per cent.; the number of passengers was 37,452,437, a decrease of 1,143,723, or 2.96 per cent. The average distance traveled by each passenger in 1895 was 19 miles, an increase of one mile. The total amount of coal mined during the year by the four companies in which the company is interested, was 2,208,234 tons, a decrease of 89,491 tons.

On the lines west of Pittsburgh operated by the Pennsylvania Company and the Pittsburgh, Cincinnati, Chicago & St. Louis the results were as follows:

Pennsylvania Co.

	1895.	1894.	Inc.
Gross earn	$20,888,964	$17,904,422	$2,984,542
Oper. Exp	12,586,336	11,524,288	1,062,048
Net earn	$8,302,628	$6,380,134	$1,922,494
Rentals, interest, etc	7,383,364	7,067,610	315,754
Net profit on Penn. Co.'s lines	$919,264	def. $687,476	$1,606,740

Pittsburg, Cincinnati, Chicago & St. Louis.

Gross earn	$18,135,126	$16,736,569	$1,398,557
Oper. Exp	13,166,364	12,475,591	690,773
Net earn	$4,968,162	$4,260,978	$707,74
Rentals, interest, etc	3,678,075	3,563,217	114,858
Net profit on P., C., C. & St. L. lines	$1,290,687	$697,761	$592,926
Net profit on lines directly operated west of Pittsburgh	$2,209,951	$10,285	$2,199,666

On the other Pennsylvania lines which are operated through their own organizations, and of which the most important is the Terre Haute & Indianapolis (Vandalia), the gross earnings were $8,958,385, and the net earnings $1,557,252. There was a loss from operation of $310,918. Of this loss the Pennsylvania Railroad is responsible for $222,085, which deducted from the profit shown above ($2,209,951) leaves a net profit on all lines west of Pittsburgh for 1895 of $1,987,866.

The amount expended on account of construction, equipment, and real estate during 1895 on the lines west of Pittsburg was $2,053,658. The larger portion of the expenditures for capital account on these lines was for additional equipment. The main items of construction were the widening for double track of the tunnels on the Pittsburg Division of the P., C., C. & St. L.; the increase of double track on the Western Division of the Pittsburg, Fort Wayne & Chicago, and the revision of the line of the Cleveland & Marietta. The Newport & Cincinnati Bridge Co. also expended a large sum rebuilding the bridge over the Ohio River at Cincinnati. The masonry is entirely finished and the approaches are under construction, and the new bridge, which will carry not only the railroad, but also furnish facilities for trolley and wagon traffic, and for foot passengers, will be completed during the present year.

In view of the fact that a large amount of the bonds upon the Western lines bearing seven per cent. interest was approaching maturity, $3,000,000 of the consolidated four per cent. mortgage bonds of the Pittsburgh, Chicago & St. Louis Railway, held in the treasury of the Pennsylvania Co., were sold, the proceeds being used for construction and equipment purposes and in anticipating the payment of the obligations referred to.

The number of tons of freight moved on the lines west of Pittsburgh was 55,155,249, an increase of 11,235,771. The number of passengers was 17,111,177, an increase of 332,361.

All lines east and west of Pittsburgh for the year moved 160,410,144 tons of freight and carried 75,052,479 passengers.

The assets of the insurance fund on hand at the end of the year were $3,779,701, being an increase of $310,891 over the previous year.

The membership of the Employees' Relief Fund at the close of the year, 36,432, was the largest since its establishment. During the year the members contributed $641,849, while the company and its affiliated lines, in addition to the payment of $98,658 for operating expenses, also contributed $36,632 for extra benefits to members whose disability had continued for more than 55 weeks, and who were, therefore, no longer entitled to regular benefits from the Fund. The total receipts of the Fund, including interest and other small items, were $790,174, which, with the balance on hand at the beginning of the year, $230,600, made an aggregate of $1,020,774, out of which $254,298 were distributed as death benefits, being an average in each case of about $575, and $337,197 in cases of disability arising from sickness and accident. After meeting all its obligations for the year and providing for unadjusted claims, a balance of $247,498 remained to the credit of the Fund. The number of employees who availed themselves of the benefits of the Employees' Saving Fund continued to increase, there being 4,513 at the end of the year, as against 4,112 in 1894. The amount received from depositors during 1895 was $497,591, and the balance in the Fund at the close of the year was $1,578,884. Of this amount $1,500,000 have been invested in 4 per cent. securities.

President Roberts referring to the formation of the Joint Traffic Association says: "While sufficient time has not elapsed to thoroughly test its working, yet enough has been accomplished in the correction of evils to demonstrate its value, not only to the railroads, but to the public, and to justify the belief that to it, or some like organization, the Interstate Commerce Commission must look for the potent agency to enable it to enforce the provisions and secure the results sought to be accomplished by the passage of the Interstate Commerce Act.

The Lehigh Valley Railroad has issued one of the most elaborate advertisements that has been seen in railroad circles for a long time, being nothing less than two hundred large original photographs of scenery along the line of the road, all beautifully mounted and framed, and exhibited in a single collection. This collection has been shown to thousands of visitors at Philadelphia, Rochester and Buffalo and last week was brought to New York; and the friends of the road were invited to inspect the views at the Waldorf Hotel, where they where hung in a large room for two days. These photographs are the work of Mr. W. H. Rau, of Philadelphia, and are equal in clearness and artistic finish to any we have ever seen. Mr. Rau is an expert in outdoor work. The Lehigh Valley has long advertised its territory as the "Switzerland of America," and numerous views in this collection tend to confirm the claim, although the photographer has by no means exhausted the resources of the mountain districts of Pennsylvania. Evidently he has stuck pretty closely to the line of the road, a circumstance which will be appreciated by passengers who ride over the road, but who cannot find the time to stop off to visit the mountains and waterfalls. To people with limited time at their disposal one of the most annoying things about railroad advertisements is the large proportion of scenery, the ownership of which the road claims a share in, and yet which can be enjoyed only by stopping at some obscure way station and lying over a day or two. Aside from the mountain scenery this collection of photographs is made attractive by the numerous domestic and pastoral scenes in New Jersey and Central New York, and there are innumerable photographs of streets, public buildings and residences in the large towns and cities, including a number of bird's eye views of wide range. The lakes of Central New York are well shown. Besides hauling coal and carrying passengers who are in search of business or recreation, the Lehigh Valley serves three colleges, Lafayette at Easton, Lehigh University and Cornell, and views of the buildings of these institutions are shown. All roads lead to Niagara Falls (if they can) and the enterprising G. P. A. did not forget to send his photographer there in this case. Indeed, one or two of his views of the falls are notable for their exceptional excellence.

NEW PUBLICATIONS.

Journal of the Western Society of Engineers. Published bi-monthly by the Society, at 1737 Monadnock Block, Chicago. Subscription price, $2 per volume of six numbers.

It will be remembered that the Western Society of Engineers recently decided, after a long period of discussion and doubt, to detach itself from the Association of Engineering Societies. One result is the appearance now of No. 1, of Vol. I., of the *Journal of the Society.* This is a creditable volume of 144 pages, with a valuable supplement. The supplement is a set of profiles of waterways from Chicago and Duluth in the West to Quebec and New York in the East, by the way of several great lakes and their connecting waters. The profiles are plotted to a scale of 10 ft. vertical to each centimeter and one mile horizontal to each centimeter. This set of profiles is compiled by the Publication Committee of the society from the records of the sanitary district of Chicago. The papers are "Notes on the Dry Docks of the Great Lakes," by A. B. Powell; "Oriental Railways," by Clement F. Street; "New Experimental Data for Flow Over a Broad Crest Dam," by Thomas T. Johnston and E. L. Cooley. There is a topical discussion on "Hydraulic Cement." This opens with a paper of 15 pages by Mr. Alfred Noble on "Cement and Its Uses," which is a careful and valuable study. Mr. Charles Sooysmith contributes a note about the Silica Portland cement. Mr. Thomas T. Johnston contributes to this discussion a paper on "Cement and Cement Mortars" containing a considerable amount of data.

Forty-two pages of the volume are taken up with abstracts of papers in foreign and American transactions and periodicals. A good many of these are taken directly from the valuable extracts published at intervals by the Institution of Civil Engineers (London). Others are prepared originally for the *Journal.* This is an excellent idea, and if it is kept up with care and thoroughness will add very much to the value of the *Journal.*

The volume closes with a brief memoir of Gen. Orlando M. Poe, prepared by Messrs Liljencrantz, Casgrain and Noble. With the memoir is a portrait of General Poe.

Messrs. John Wiley & Sons announce for July, 1896, *Higher Mathematics for Engineering Colleges;* edited by Mansfield Merriman, Professor of Civil Engineering in Lehigh University, and Robert S. Woodward, Professor of Mechanics in Columbia College.

It is designed especially for the use of junior and senior classes in schools of engineering, but intended to be adapted to the use of advanced students and readers of mathematics generally; containing a concise treatment of subjects not commonly found in text-books, but upon which lectures are now given in the best schools. The specialists who co-operated with the editors in contributing chapters are: Prof. W. E. Byerly, Harvard University, "Harmonic Functions"; Prof. T. S. Fiske, Columbia College, "General Theory of Functions"; Prof. G. B. Halsted, University of Texas, "Projective Geometry"; Prof. E. W. Hyde, University of Cincinnati, "Point Analysis and Ausdehnungslehre"; Prof. W. W. Johnson, U. S. Naval Academy, "Differential Equations"; Prof. A. Ma farlane, Lehigh University, "Vector Analysis and Quaternions"; Prof. J. McMahon, Cornell University, "Hyperbolic Trigonometry"; Prof. F. Morley, Haverford College, "Elliptic Integrals and Functions"; Prof. D. E. Smith, Michigan Normal School, "History of Modern Mathematics"; Prof. L. G. Weld, University of Iowa, "Determinants." Chapters are also prepared by the editors on the Solution of Equations and Probabilities and Theory of Errors. Each topic is not only treated in the light of the best modern theory, but is applied to the solution of problems in engineering and physical science.

TRADE CATALOGUES.

The Thompson-Ryan Generator.—The J. H. McEwen Mfg. Co., 26 Cortlandt street, New York, sends us a catalogue describing the Thompson-Ryan dynamo. This is the initial issue of the catalogue of dynamo-electric machinery put out by the company as builders of such machinery, although they are well known as steam engine builders. The dynamo in question was based on the studies of Prof. H. J. Ryan, of Cornell University and perfected by Mr. Milton E. Thompson; and the McEwen Company has acquired exclusive rights for its sale and claims that it is superior to all other continuous current generators. The chief distinctive feature is a special winding, called "balancing coils," for neutralizing the magnetic effects of the armature currents. It is claimed that armature reaction is prevented absolutely and entirely. Furthermore, a device is used by which the commutation field increases in strength with the load. The field castings in all of these

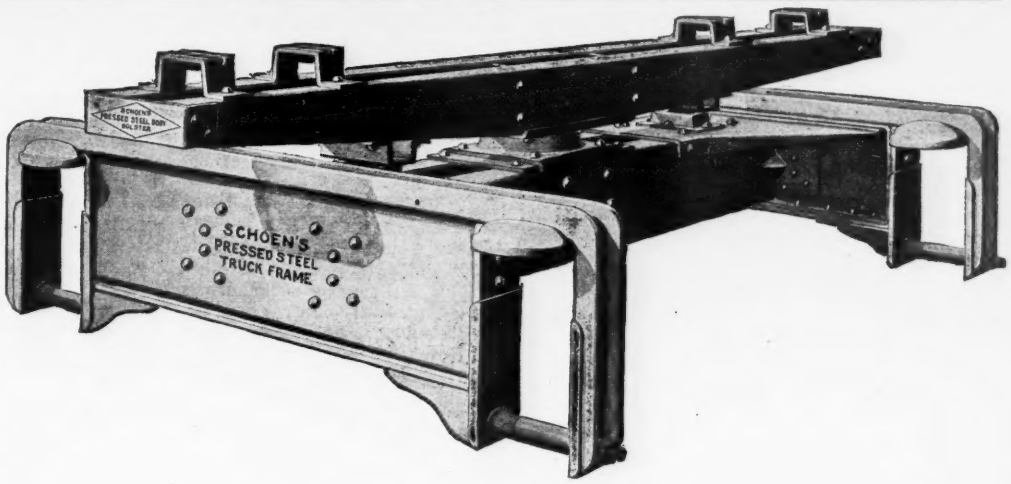
machines are of but three pieces, held together by four bolts. These are of steel and very light in proportion to the output. All of the armatures are constructed on the same general style; the cores are built up of thin plates of a special steel, the distinctive feature of which is its unusually low hysteresis loss.

It is claimed that these generators give a remarkable output which ranges from 15 to 20 watts per pound for slow speed, direct connected machines, and is said to be from two to three times as great as the output of the ordinary type of dynamo.

The Thompson-Ryan dynamo was illustrated in our issue of Dec. 27, 1895.

Schoen's Pressed Steel Truck for Freight Cars.

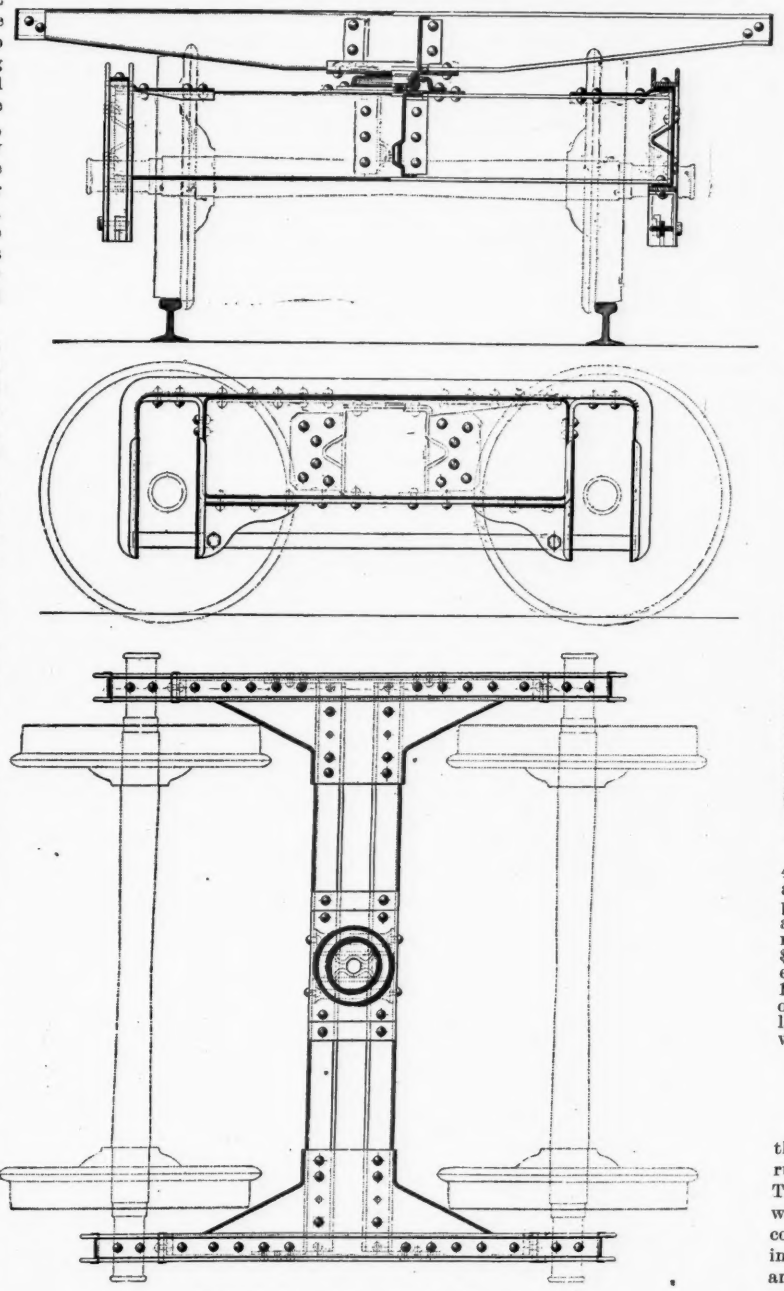
The Schoen Pressed Steel Co. is now prepared to supply a new pressed steel truck for freight cars, which we believe is from the design of Mr. Charles T. Schoen. The designer started with the ideas of putting the springs directly over the journals and of building a truck which shall be cheap in first cost and cheap to maintain. Furthermore, as he expects that the truck will carry its load without appreciable deflection, he has designed a steel body bolster which is expected to be stiff enough to keep the load off the side bearings. The truck and bolster are shown in perspective and in line in the accompanying engravings.



Schoen's Pressed Steel Freight Truck.

The side frame has the top chord or compression member in the form of an inverted channel; this gives great stiffness as compared with a flat member. The bottom chord or tension member of the structure is a bar $\frac{5}{8} \times 4$ in., extending along the bottom and up, forming the inside jaws of the pedestal, and across the top of the pedestal. The space between the upper and lower members of the side frame is filled in with a diaphragm. This diaphragm is flanged on all four sides, the flanges supplementing the strength of the top and bottom chords; and the whole is riveted by hydraulic power.

A distance piece is placed in the jaw of the pedestal, under the journal box. A heavy bolt passes through it and through the bracket and the outer leg of the pedestal, secured by two nuts and a split key, tieing the jaws of the pedestal firmly. In the jaw of the pedestal are chafing plates, which prevent wear on any part of the frame. These plates have a rectangular hole near the lower end, and are slipped over the tie bar. These chafing plates are light and will last many years, and can be replaced for a few cents.



Schoen's Pessed Steel Freight Truck.

The transoms are set with their flanges toward each other and vertical bracing is used to tie them together, and, in addition, a spacing plate is used under the center plate, which is varied in height to suit conditions, and at the same time ties the two channels, composing the transom, thereby stiffening them for resistance against transverse strains.

Flanged gusset plates, extending from the inner jaw of each pedestal and well out on the transom, keep the frame square.

By placing the flanges of the channels composing the transom toward each other the body of metal composing the web of the channel is placed farthest from the neutral axis, and thereby makes the transoms stronger to resist transverse strains; also giving good clearance between the transoms and wheels for the brake beams and brake shoes. The ends of the channel are blanked out, and in the process of forming the flanges the ends are formed at right angles to the body, giving a good and economical means of attaching the transoms to the side frame. These transoms rest on the tension member of the side frame and are well riveted both to the gusset plates and side frames. In the two vertical braces in the center of the transoms an embossment is struck up in the process of forming them, which forms a substantial support or guide for the lower end of the king-bolt.

There is an obvious advantage in building up the side frame of a truck as shown here over making it of one piece of metal. When made of one piece the top and bottom flanges must be of the same thickness as the body or web. By this construction, however, the top and bottom chords can be made of any thickness and can be put into a shape to produce the best results. Again, there is an advantage in the formation of the pedestal. The flat faces of the compression and tension members form the guide for the journal box, and the seat for the spring bearing; but if the side frame be made of one piece of steel, it would appear that this part of the truck frame could not be made so substantial and economical, and this part of the truck frame is subjected to very severe service, especially on curves.

Again, if it becomes necessary to repair the side frame, or any part of this truck, it can be done by the companies at their own shops; whereas a side frame made of one piece, if distorted by accident, can only be put into shape again by going through the dies which formed it, which involves expense and delay in transportation.

A few of the general advantages claimed for this design of truck are: Increased car mileage; saving in dead weight; saving in flange wear on wheels, because it keeps square; saving in wear of rails; can be repaired in your shop; it reduces expenses of repairs to a minimum; it avoids hot boxes because the frame keeps square.

The material used is a special grade of mild steel made from a specification which the experience of the Schoen Co. has proved to be the best for work of this character, where impact has to be resisted.

Iron and Steel Exports and Imports During 1895.

The table below, which we reproduce from the *Bulletin* of the Iron and Steel Association, shows our imports of leading articles of iron and steel and of iron ore during the year 1895, compared with like imports in 1894:

Articles—Gross tons.	1894. Tons.	1895. Tons.
Pig iron	15,582	53,232
Scrap iron and scrap steel	2,380	6,066
Bar iron	9,228	20,049
Iron and steel rails	300	1,447
Baling hoops or ties, barrel hoops, etc.	50	.....
Cotton-ties	5	3,485
Hoop, band and scroll iron or steel	805	15
Steel ingots, billets, blooms, slabs, etc.	9,494	26,255
Sheet, plate and taggers' iron or steel	28,795	14,535
Tinplates	215,068	219,545
Wire rods, of iron or steel	22,607	26,834
Wire and wire rope, of iron or steel	4,288	5,773
Anvils	406	502
Chains	291	474
Total	309,299	378,212
Iron ore	168,541	524,153

The total value of all our imports of iron and steel, excluding iron ore, but including articles not mentioned in the above table and which are not weighed at the custom house, amounted to $25,772,151 in 1895, against $20,843,576 in 1894.

The following statement from the *Bulletin* of our exports of iron and steel and of manufactures of iron and steel is like the above, compiled from the monthly summary of the Bureau of Statistics of the Treasury Department for December.

Commodities.	1894. Quantities.	1895. Quantities.
Pig iron.....Gross tons.	24,482	26,164
Bar iron..... " "	3,147	3,329
Band, hoop, and scroll iron " "	100	198
Car-wheels.....No.	14,662	14,106
Steel ingots, bars, rods.....Tons.	1,463	3,148
Cut nails and spikes..... "	8,180	7,875
Horseshoe and wire nails..... "	1,738	2,353
Iron plates and sheets..... "	2,227	423
Steel plates and sheets..... "	829	812
Iron rails..... "	1,327	6,792
Steel rails..... "	12,229	8,807
Fire engines.....No.	11	2
Locomotives..... "	189	217
Stationary engines..... "	291	308
Wire.....Tons.	26,512	29,674

The total value of the above exports amounted to $5,472,903 in 1895, as compared with $4,809,359 in 1894. In addition to the articles named above there were also exported other manufactures of iron and steel, the weight and number of which are not given in the official records, amounting in value to $29,598,632 in 1895, against $25,134,370 in 1894, the total value of all iron and steel exports in 1895 being $35,071,535, against $29,943,729 in 1894. To the amounts above given may also be added our exports of agricultural implements, which are largely composed of iron and steel, and which were valued at $5,319,885 in 1895 and $4,765,793 in 1894.

Track Brakes In German Gravity Yards.

In Germany gravity switching yards are built at all the more important stations. Arriving freight trains run immediately upon the incline and are broken up. The grade of the latter is calculated so that empty cars will attain sufficient speed to reach the further sidings, consequently loaded cars, which have to be switched into a near-by siding, frequently get up too great speed, and their momentum must be diminished before they reach the cars already shunted on to that particular track. To this end the men regularly employed about the yard are supplied with long sticks which they repeatedly thrust under the wheels of the moving car to reduce their speed. The crudity of this method and its dangers have led to the invention of several types of track brakes.

One of the first constructions was mounted on a small wheel; but it was found that the wheel turned only under the first impetus of the car and then skidded. Another very good construction, which weighs only 13.5 lbs, yet has succumbed only after it had broken the momentum of 2,300 cars in the gravity yard of St. Gereon, Cologne, and, as it costs only $2.60, has stopped cars at the rate of $1.13 per 1,000. This is a thin wedge shaped tongue 9½ in. long, stiffened by a flange 1 in. deep, which bears against the side of the rail head and a spring mounted bar touching on the other side of the head, and a plate bearing against the circumference of the wheel of the car. This apparatus has the disadvantage of causing a jerky reduction of the speed and takes no account of the varying momentum of the train, which changes within wide limits according to the number of cars and their load, the height from which they start, the wind, weather, etc.

These factors are taken care of in a stationary track brake operating as follows: Brake rails of the length of the tie spacing are arranged so as to be vertically movable by an eccentric operated by the turning of a crank. The two rails are arranged to rise simultaneously. The wheels of the moving car mount the raised brake rails, and these, having an eccentric or one sided support, tip over and bear against the side of the wheel. This pressure is heavier the heavier the load.

By varying the number of brake rails brought into use a clever operator may retard a car or draft of cars just sufficiently while they pass over the brake stretch, to allow them to reach their destination without undesirable speed or shock.

The Chicago Motocycle Tests.

The *Times-Herald* of Chicago has recently published the results of the motocycle contest held at Chicago last Thanksgiving Day. These results, which we print in the tables below, were determined by a committee for this purpose, consisting of John P. Barrett, L. L. Summers and John Lundie. Most of the results appear to have been obtained from a number of tests made on the motocycles and not from the results of the race. The motors of all the machines used gasoline, except those of Morris & Salom and the Sturges Motocycle Co., which were run by storage batteries.

DETAILS AND DIMENSIONS OF MOTOCYCLES.

Motocycle.	Weight (Light). Driver, lbs	Steering, lbs.	Total, lbs.	Diam. comp. Drivers, in.	Nature of tires.	Nature of Bearing	No. of cylinders.	Diam. Bore cylinder, inches.	Stroke of piston, inches.
De La Vergne R.M.Co., New York (Benz motor)	1,250	430	1,680	47.4	Solid rubber	Roller	1	5.12	6 62
Duryea Motor Wagon Co., Springfield, Mass. (own motor)	729	479	1,208	45 6	Pneumatic	.....	2	4	4.5
Haynes & Apperson, Kokomo, Ind. (own motor)	829	421	1,250	35.6	Pneumatic	Ball	2	4	4
Lewis, G. W., Chicago, Ill. (own motor)	900	780	1,680	45.8	Solid rubber	Roller	1	5	5
Macy, R. H. & Co., New York (Roger-Benz motor)	1.440	385	1.825	47.6	Solid rubber	Roller	1	5	7
Morris & Salom, Phila. (Lundell motor)	1,260	390	1,650	39.6	Pneumatic	Ball	Two motors.	.....	.....
Mueller, H. & Sons, Decatur, Ill. (Mueller-Benz motor)	1,251	385	1,636	48.	Solid rubber	Roller	1	5.5	6.25
Sturges Electric Motocycle Co., Chicago, Ill. (Lundell motor)	2,085	1,456	3,535	50.2	Solid rubber	Plain	One motor.	.....	.....

POWER AND DUTY TESTS OF MOTOCYCLES.

Motocycle.	No. of run.	Speed in ft. per minute.	Pull Exerted, pounds	Horse power exerted at rim of wheel	Horse power consumed in mechanism.	Total H. P. developed in cylinder.	Mechanical Efficiency.	Gasoline—Lbs. consumed per hour.	Gasoline—Pounds consumed per horse power hour at rim of wheel.	Foot pounds at rim of wheel per pound of gasoline.	Cost per horse power hour at rim of wheel—cents.
De La Vergne, R. M. Co., New York (Benz motor).	1	619	37	.70	.71	1.41	.50	3.24	4.63	428,000	9.26
	2	1,000	51.8	1.57	1.40	2.97	.53	4.45	2.83	700,000	5.66
Duryea Motor Wagon Co., Springfield, Mass. (Own motor).	1	432	83.8	1.10	.59	1.69	.65	4.01	3.61	545,000	7.28
	2	434	88.5	1.16	.59	1.75	.65	3.78	3 24	623,000	6.48
Haynes & Apperson, Kokomo, Ind. (Own motor).	1	376	23.1	.26	.61	.87	.30	5.78	21.8	91,000	43.60
	2	796	39.3	.95	1.28	2.23	.43	5.75	6.04	327,000	12.08
Lewis, G. W., Chicago, Ill. (Own motor).	1	353	49.9	.53	.53	1.06	.50	3.29	6.20	319,000	12.40
	2	491	17	.25	.65	.90	.28	3.28	12 8	155,000	25.60
Macy, R. H. & Co., New York (Roger-Benz motor).	1	521	52.1	.83	1.48	2.31	.36	3.22	3.90	515,000	7.80
	2	945	87.2	2.50	2.68	5.18	.48	4.90	1.96	1,010,000	3.92
Mueller, H. & Sons, Decatur, Ill. (Mueller-Benz motor).	1	423	92.1	1.18	.61	1.79	.66	3 50	2.96	669,000	5.92
	2	540	42.3	.69	.77	1.46	.47	3.87	5.60	354,000	11.20
	3	564	38.6	.66	.81	1.47	.45	3.77	5.71	347,000	11.42
	4	984	73.4	2.18	1.57	3.75	.58	3.40	1.57	1,268,000	3.14
	5	1,168	34.7	1.23	1.86	3.09	.40	4.15	3.37	588.000	6.74
						Total H. P. developed in motor.		Electrical input H. P.	K.w. hours supplied to batteries per H.P.H. at rim of wheel.	Foot pounds at rim of wheel per K. W. H.	
Morris & Salom, Philadelphia (Lundell motor).	1	1,025	25.5	.78	.34	1.12	.70	1.36	1.74	1,138 000	17.4
	2	2,015	29	1.78	.68	2.46	.72	2.90	1.63	1,215,000	16.3
Sturges Electric Motocycle Co., Chicago, Ill. (Lundell motor).	1	370	41	.41	.21	.62	.66	.99	2.42	818,000	24.2
	2	892	42	1.14	.39	1.53	.74	1.94	1 70	1,165,000	17.0

A French Lighthouse Tower of Concrete.

The following account of the construction of a lighthouse, on the Trois Pierres reef, in the roadstead of the sea port Lorient in the Bay of Biscay, is condensed from a paper by Mr. G. Mallat, civil engineer in charge, published in the *Annals des Ponts et Chausées*, October, 1895. The erection of this lighthouse and the laying of its foundation, presented great difficulties on account of the exposed position of the reef upon which it was built.

The original project contemplated that the lighthouse should be built upon a pier of Portland cement concrete, poured under water, into an inclosure formed of bags filled with concrete of the same kind.

The lighthouse proper is 16 ft. 5 in. in diameter at the base; the foundation pier was constructed in three parts, all cylindrical (Fig. 1). The diameters of these three courses, including the outside wall, which is uniformly 3 ft. 3⅜ in. thick, are respectively, 30 ft. 10 in., 27 ft. 3 in. and 23 ft. 7½ in. The lowest course has a height varying with the inequalities of the rock bed; its mean height is 4 ft. 5½ in., the next, 3 ft. 7⅜ in. and the upper course 3 ft. 9¼ in.; the total height of the foundation pier is thus 11 ft. 9¾ in.

The bags forming the exterior wall were placed by hand, by divers, while the interior concrete filling was lowered, in sheet iron buckets, which were opened under water by the divers.

The surface of the bed-rock was covered with a dense submarine vegetation, consisting of sea weeds nearly an inch in diameter. Divers, armed with sickles, first cut the weeds away and the roots and mosses remaining attached to the rock were then burned away by breaking a number of bottles of hydrochloric acid upon the latter, which was subsequently completely cleaned by three successive scourings, first with steel scrapers, next with iron wire brooms and finally with bristle brushes. A central vertical mast, reaching above the highest tide level, was then erected, which was found very useful in the construction of the exterior wall of bags, exactly in accordance with the plans. One of the divers wore a belt around his waist, to which was attached one end of a light wooden pole, the other end of which was connected to the central mast by means of a loose collar, in the same manner as a gaff is to a mast. The length of this pole was such that the diver, having his back turned to the mast had his belly flush with the interior face of the surrounding wall of bags: it only remained for him, with the aid of another diver, to place straight before him the bags which were lowered to him from the lighter.

It was found at the start that the force of the currents was never sufficient to prevent the divers from working, even at ebb tide. The main obstacle to continuous work was found in the condition of the sea. It was necessary to have a large lighter anchored close to the reef; upon this lighter the concrete was mixed, which was impossible when there was considerable sea running, as was invariably the case when the wind was either west or south.

When the circular wall was being constructed, each bag of concrete was lowered in a sheet-iron box of suitable size, by means of a block and fall hung from the derrick boom of the lighter. The two divers opened the movable bottom of the iron box, of which they had

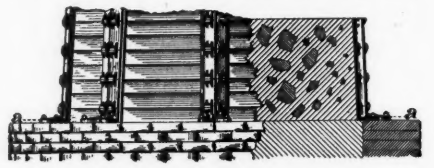


Fig. 2.—Elevation of Erecting Casing.

guided the descent; by this means there was no disturbance of the concrete under the water, and hardly any washing away of the cement. The bags were made of solid canvas, but not very close webbed, which permitted them to cement themselves one to the other. Each bag, when filled, was 39⅜ in. long and contained 3.17 cu. ft. of concrete, making 8½ bags to the cubic yard.

When the outer wall had reached a certain height the filling in was commenced; the concrete which was to constitute the body of the pier was poured within the enclosed space. It had the same composition, hereafter described, as the concrete in the bags. To run the concrete, a cylindrical bucket of sheet iron, having hinged top and bottom lids, capable of being opened at both ends, was used. The bottom lid, serving for the discharge of the concrete, was opened by the divers.

The composition of the concrete to be adopted was the subject of considerable study on the part of the engineers. Experiments, extending over a period of three months, demonstrated that a concrete consisting of a mixture of broken stone with mortar, though rich in cement, did not give good results. By substituting for the broken stone gravel mixed with sand a satisfactory concrete was obtained, of which the proportions were, 1,102⅛ lbs. of Portland cement to 35 cu. ft. of gravel. This concrete has given excellent results, being free

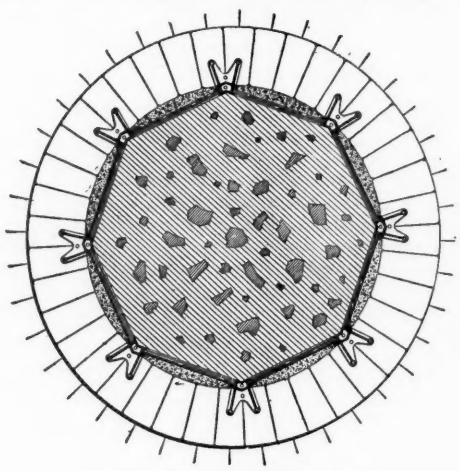


Fig 3.—Plan of Erecting Casing.

from cavities and perfectly homogeneous throughout, and having remained intact to the present time.

The completion of the foundation required three summers, during which 54 days' work was done, of which 24 days were in 1891, 23 in 1892 and 7 in 1893.

The actual expense of the foundation pier, including everything which related to the execution of the work, viz., cleaning of bed-rock, use of tugboat, cost of cement, labor, divers' time, watchmen, etc., etc., amounted to 16,500 francs ($3,185). The contents, 195 cu. m. (6,886 cu. ft.), cost per cubic meter $16.33, or, say $12.50 per cubic oard. This does not include cost of experiments.

The accompanying illustrations clearly show the leading features of the structure: Fig. 1, being a vertical central section, in elevation, with the lantern omitted, showing relative proportions of retaining wall of bags and the foundation pier, of which they constitute a part, and the tower.

The tower, an octagonal truncated pyramid, was constructed of concrete, of the same composition as that used in the foundation. It was erected by means of a casing (see Figs. 2 and 3) of planks about 9 in. wide by 3 in., by 5 ft. 10 in. long, superposed upon each other, secured and keyed at their extremities between the lateral flanges of cast-iron angle blocks some 18 in. long, also superposed and bolted together, thus forming columns, one at each angle of the octagonal casing. These columns were built up and the planks laid in the

channels formed by their lateral flanges, gradually, and as required, to form the outer casing for fresh additions of concrete until the required height was reached, when the entire casing was taken down, and could be used again in the construction of similar towers. The cost of the tower was: Columns, castings and lumber, $619.17; building of tower, $2,274.86. The cubical contents were 119 cubic meters (155⅓ cu. yds.); cost per cubic meter, $18.20, or $13.83 per cubic yard.

By comparing the cost per cubic yard of superstructure, $13.83, with that of the foundation, the curious fact is shown that the submarine work was actually the cheapest of the two, $12.50. This is accounted for by Mr. Mallat on the ground that, while the submarine work was in progress, few interruptions were met with, and the men could work undisturbed by the tides, whereas the case was different on that part of the superstructure which was sometimes above and sometimes below the surface of the water, so that frequently only one hour's work could be done in a day, while the general expense remained the same as if a full day's work had been accomplished. Since its completion, Oct., 1894, the "Trois Pierres Lighthouse" has been exposed to storms of exceptional violence, one particularly on Nov. 12, 1894, which occurred barely one month subsequent to the completion of the work, and another on Jan. 13, 1895, which caused great damage to lighthouses and marine structures in the vicinity. These the "Trois Pierres" foundation and tower resisted successfully.

A careful and thorough examination, made April 10 and May 8, 1895, demonstrated that the bags of the foundation were intimately united together; no single bag had been displaced; they had retained their primitive form, even to the minutest details; their aggregation constituted a block of which it would be impossible to separate the elements. The concrete of the pier, and also of the tower, had acquired the hardness of rock; it presented clean fractures, with a sharp ring to the ear, under the hammer and chisel.

FIG. I.

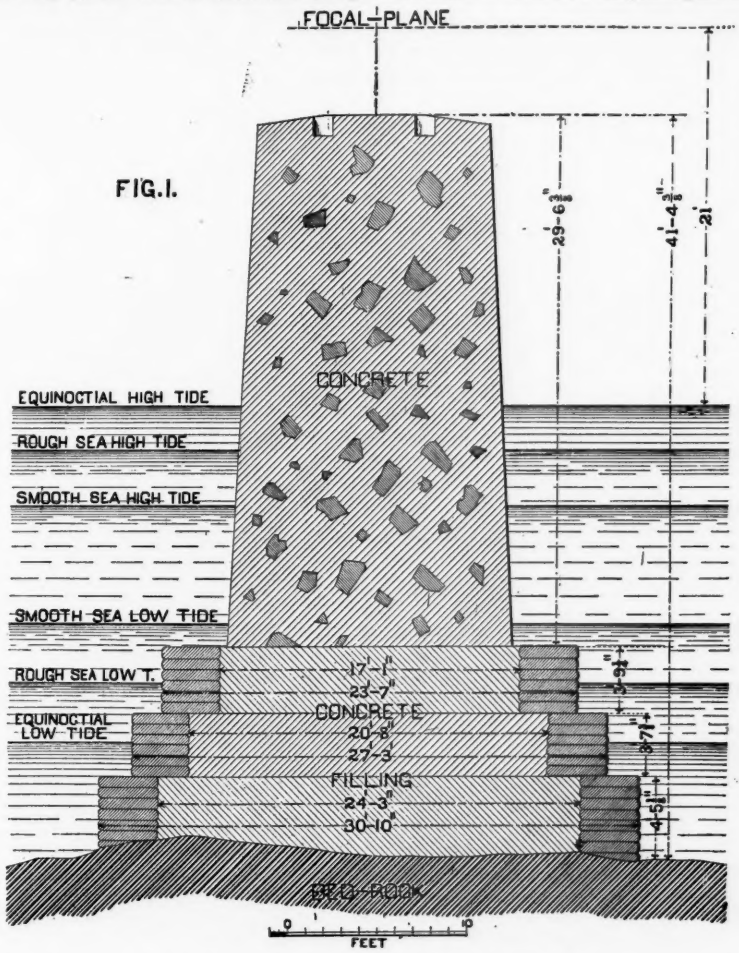


Fig. 1.—Concrete Lighthouse Tower at Lorient, France.

TECHNICAL

Manufacturing and Business.

Messrs. Wendell & MacDuffie, Havemeyer Building, New York City, General Agents of the Taunton Locomotive & Manufacturing Co., of Taunton, Mass., have received an order from the Steinway Electric Railway Company, of Long Island City, N. Y., for Taunton track sprinklers, with a capacity of 2,700 gals. each.

The Chicago Pneumatic Tool Co. last week received orders for two of its tools from France, three from Russia, two from New Zealand, four from Australia and one from Austria, and shipped ten to London.

A suit has been entered by the Harris Car Company, of which L. J. Harris is President, against the American Palace Car Co. and George A. Denham, Treasurer, in the United States Court at Boston, which involves a patent, covering the exclusive use in sleeping cars of a berth pocket beneath the floor. The Harris patent was used on the "Jeannette." It is alleged in the bill of complaint that the American Palace Car Co. has constructed a car "Boston," which is a direct infringement of the claims in the Harris patent.

Mr. William Burg, whose office is in the Railway Exchange Building, St. Louis, has recently been appointed agent in St. Louis and the southwest for Phillips-Nimick & Co., Pittsburgh, Pa.; Zug & Co., Lindsay & McCutcheon, all of Pittsburgh. Mr. Burg was formerly the Secretary of the Ewald Iron Co., of St. Louis, but has recently opened an office as an iron and steel commission agent.

Iron and Steel.

The Union Iron Works, of San Francisco, will shortly commence work on two composite gunboats which they are to build for the United States Government. They are to be completed within 15 months. The principal dimensions are, length on load water line, 174 ft.; beam, 34 ft.; draft, 12 ft; displacement, 1,000 tons; indicated horse power, 800; estimated speed, 12 knots.

The *Iron Age* for Feb. 27 reports that the Pacific rolling mills at San Francisco have adopted petroleum for fuel.

The *Bulletin* of the American Iron and Steel Association places the total production of Bessemer steel in the United States for 1895 as 4,909,128 gross tons. The nearest approach to this was in 1892, when 4,168,435 tons were produced. The preliminary estimate for the open hearth output is placed at 1,000,000 tons. This figure was 784,936 tons in 1894. During 1895, 30 furnaces were installed, representing about 400,000 tons annual capacity. Conservative estimates have placed the total annual output of the country, with all mills working at their utmost capacity, at about 7,000,000 gross tons of open hearth and Bessemer steel.

The great weight of the barbette armor plates recently finished by the Carnegie Steel Co. for the United States battleship Iowa, will necessitate the use of a separate car for each plate in transportation to the Cramps' shipyards, at Philadelphia. The weight of each plate is about 48 tons.

Jones & Laughlin, of the American Steel & Iron Works, of Pittsburgh, will shortly enlarge their open hearth basic steel plant by the addition of four new 40-ton furnaces.

The Illinois Steel Co. will soon make extensive improvements in its Milwaukee works. The old nail mill will be replaced by a new one, and the fish-plate mill will also be rebuilt. The boiler making shops will be much improvod. The work will be done without closing down the shops.

The contract for gun forgings for the guns of the two new battleships Kearsarge and Kentucky, now being built at Newport News, has been divided between the Midvale Steel Co. and the Bethlehem Iron Co., the former securing those for the 8-in. guns, the latter those for the 13-in. guns.

The Eastern Bar Iron Association met at the rooms of the American Steel and Iron Association in Philadelphia, Feb. 21. The card of extras adopted by the National Bar Iron Association was endorsed. It was decided to postpone the matter of advancing the price of bar iron until the next meeting.

The *Iron Trade Review* says that the Ironton Structural Steel Co. will improve its plant at Duluth at a total cost of nearly $200,000. The improvements consist of a new blooming mill with very large hydraulic shears, soaking pits, basic open-hearth furnace and electrical crane and charging service. The expectation is that when the work is completed the capacity of the plant will be 200 tons daily of finished material.

Fire in the foundry of the Kurtz & Buhrer Foundry Co., of Chicago, destroyed a part of the plant on Feb. 25, the loss being placed at about $100,000.

A. W. Peene, architect, is inviting bids for the erection of a wood and iron wharf at the foot of Sherman avenue, Hamilton, Ont., for the Hamilton Iron and Steel Co.

The *Ironmonger* announces that the leading British manufacturers of steel rails have formed a combination to maintain prices and regulate sales. It is said that while the mills are fairly busy, profits have been low for some years past. This combination differs from that previously existing, in that the German rail makers are not included in it. It is believed that better prices can be secured under the new arrangement.

Press reports say that the Penn Steel Casting Company has decided to erect a large addition to its plant.

The officers of the Bath Iron Works, of Bath, Me., are: President and Manager, T. W. Hyde; Treasurer, E. W. Hyde, Superintendent Engineering Department; J. S. Hyde, Consulting Engineer, C. E. Hyde; Purchasing Agent, J. S. P. Burke.

The New Niagara Bridge.

The photograph of the new Niagara arch bridge, with a span of 840 ft., printed in last week's *Railroad Gazette*, was a copyrighted production of W. E. Tuttle, Manager of the Press News Association, of Niagara Falls, N. Y., made from the drawings of the Engineer. The *Railroad Gazette* is indebted to Mr. Tuttle for some of the matter contained in the article published.

Car Coupler Litigation.

We published last week, as a supplement, the full text of the recent decisions in the suits brought by the Gould Coupler Company against various other companies. In our reprint of the decision of Judge Coxe, third column, first page, occurred an unfortunate typographical error. The Judge said: "The advantages of Browning's invention have been very generally recognized and over three hundred thousand couplers embodying the invention are used on many of the principal railroads of the country." Unfortunately the word "hundred" was left out; which error, of course, would not mislead the intelligent reader, but it does mar what was intended to be an accurate reprint of the decision.

Anthracite Grates.

A Committee of the Master Mechanics' Association has been appointed to report on the question, What kind of grate is the most suitable for burning anthracite coal—cast-iron shaking, or water bar? The Committee consists of Mr. H. Wade Hibbard, Professor of Mechanical Engineering, University of Minnesota; Mr. George W. West, Superintendent of Motive Power, New York, Ontario & Western; Mr. David Brown, Master Mechanic, Delaware, Lackawanna & Western, and Mr. E. L. Coster, 10 Wall street, New York City. The Committee begins business by sending out a list of 35 questions, answers to which should be promptly sent to Mr. Coster. The list being so voluminous we shall not reprint it, but would recommend that anybody, whether a member of the Association or not, who is interested in the subject, should write to Mr. Coster for the list of questions if he has not already received them. The Committee is evidently disposed to make a very careful and valuable study of the subject.

Separation of Grades at Northampton, Mass.

The *Springfield Republican* states that engineers are busy preparing the working plans and specifications for the extensive grade-crossing changes at this place (described in the *Railroad Gazette*, Aug. 9, 1895). The final arrangements have all been completed, and as soon as the specifications can been published the bids will be called for and the contracts let. The work of grading and the construction of the freight depots and roundhouses will be on separate contracts. The sketches for the freight stations are completed, and blue prints and working plans are now being made. Local contractors may have an opportunity to figure on sub-contracts. The work of the greatest proportions is the grading, and this will not be begun much before April 1. From that time until September the work will be pushed with all possible speed in order to get the freight yards ready for the fall business. The grading will all be finished, together with the separation of the crossings north of Edwards street and the freight depots during this year. Next season the passenger station will be constructed and the other changes and separations made. For the work of grading, the railroads furnish track and trains, and the necessary sand-pits and the contractors manage the men and material. All of the grading and masonry work will be done under a single contract. The contracts will probably be let within a few weeks.

The Goodwin Dump Car.

The Goodwin Car Co. has established an office at 55 Broadway, New York City. The main office is in The Rookery, Chicago, Ill. Mr. John M. Goodwin is President, Mr. G. T. Plowman Secretary, and Mr. Joseph J. Koehle Treasurer. A detailed description of the Goodwin car in its present form was given in the *Railroad Gazette* of December 6, 1895. The company has made a

contract with the Allison Manufacturing Co., of Philadelphia, to build an exhibition train of these cars. They are to have steel frames and to be rigged with the patent air dumping apparatus. They are to be eight-wheeled, of 70,000 lbs. capacity.

Rich Find of Iron Ore.

Press reports say that E. T. Buxton, President of the Bank of Commerce of Superior, Wis., has been apprised of the discovery of a rich vein of iron on lands owned by himself and others in St. Louis County, Minn. It is said to be the richest deposit ever discovered on the Northern Minnesota ranges.

English Comment on American Rail Prices.

A contemporary quotes two illustrations to show how producers in protectionist countries are accustomed, in default of home orders, to accept prices for export which cannot possibly pay. A contract for 12,000 tons of steel rails for Chili has just been taken by a German firm at, it is said, £4 8s. per ton, delivered at Antwerp, and one for 10,000 tons for Japan by the Illinois Steel Company at £4 7s. 6d. per ton, delivered at New York, nearly 1,000 miles from the works of the company. The price now current at Middlesbrough and at Barrow is £4 15s. That the accepted prices are very much below the current quotations in Germany and the United States is easily demonstrable. Last month the price of Rhenish-Westphalian steel rails was £5 10s., and that of Silesian £5 8s. per ton. The quotation of Belgian steel rails is also at the present time £5 10s. per ton. At New York the regular price delivered there is £5 16s. 8d. It is obvious, therefore, that the acceptance of £4 7s. 6d. for rails which have to be brought to that port all the way from Chicago must have been induced by a desire merely to provide fuller employment for the works of the seller.—*The Practical Engineer.*

Regarding this matter, the *Bulletin* of the Iron and Steel Association prints the following:

The order for 10,000 tons of steel rails for Chili, which it has been said had been secured for this country by Mr. R. W. Grace, has gone to Germany. The English story that this country has secured an order for 10,000 tons of rails for Japan is probably as erroneous as the Chilian story.

Section 4, Boston Subway.

Bids for building Section 4 of the subway in Tremont street, from Boylston street to Warrenton street, will be received by the Boston Transit Commission until March 19. The contractor will be required to exercise more than ordinary care in preventing obstruction to traffic. Some items of work to be done are estimated to be as follows: 52,000 cu. yds. of earth excavation; 500 tons of iron and steel, furnished by the Commission, to be set in place; 12,000 cu. yds. of concrete and brick masonry; 3,000 lin. ft. of spruce piles in place; 3,000 sq. yds. of plastering of Portland cement mortar on outside of subway; 15,000 sq. yds. of waterproof coating for subway; 2,000 lin. ft. of 12-in. and 10-in. vitrified pipe sewer. The depth of excavation will be approximately from 24 to 38 ft.

The Susquehanna Power Transmission Plant.

News comes from Baltimore that Mr. Clemens Herschel, of New York, has completed plans for the much talked of plant for developing the power of the Susquehanna River at Conowingo Falls, Md. It is further stated that work upon the construction of this plant will be begun early in the present year. The power developed is to be transmitted electrically to various manufacturing towns in the neighborhood of the falls. It is estimated that about 100,000 H. P. will be secured when all the power available is developed. One plan to utilize the power was a proposed electric railroad from Baltimore to Gettysburg.

Standard Angles.

We published on Jan 31 the standard shapes for beams and channels submitted by a committee of the American Association of Steel Manufacturers. This association at its meeting in Washington, D. C., Jan. 17, adopted the following sizes of angles as standards:

Even legs.		Uneven legs.	
6 × 6	1¾ × 1¾	6 × 4	3½ × 2½
4 × 4	1½ × 1½	6 × 3½	3 × 2½
3½ × 3½	1¼ × 1¼	5 × 3½	2½ × 2
3 × 3	1 × 1	5 × 3	
2½ × 2½	¾ × ¾	4 × 3	
2 × 2		3½ × 3	

The maximum and minimum weights for the various sizes of angles will be in accordance with former practice, and the variation in thickness of metal will be by sixteenths of an inch. The list embraces all those necessary for ordinary structural purposes, and it is thought that confining the designing of structures to these 20 sizes will insure better service and more prompt delivery to the consumer

The Iron Trade of Europe.

The iron trade all over Europe is in a prosperous condition. In France there has been only a slight increase in production, but the iron works are all busy. In Belgium the volume of trade has increased, and some of the larger works have difficulty in keeping up with orders, especially for rails and structural steel for export. In Germany there is also reported enough orders to keep the works busy. The exports of iron and steel of all kinds from Germany for the 11 months to Nov. 30 were 1,387,311 metric tons, an increase of 68,150 tons, or 5.2 per cent. over 1894, and of 276,083 tons, or 24.8 per cent. over 1893. In Austria-Hungary there was in November and December a remarkable revival in the iron trade, and all the works are full of orders.—*Engineering and Mining Journal.*

Oil Fuel in the British Navy.

There has been a change in the torpedo-boat destroyer to be tried with oil fuel. The Daring, which was originally decided upon, is to be replaced by the Hart, built by the Fairfield Company. She has the same type of boiler as the Daring—the Thornycroft, although some slight modifications were made by Mr. Laing when designing the machinery for the three Fairfield boats. The system of oil burning to be adopted is that in use on the Great Eastern Railway. A fire of coke and limestone is first made, and the oil is injected into the furnace with a steam jet. Thus the coke protects the grate, and, moreover, should the oil run short coal can easily be resorted to without any change in the boiler.

THE SCRAP HEAP.

Notes.

A landslide and snowslide combined blocked the Great Northern Railway in the Cascade Mountains for six days last week.

A passenger train on the South Carolina & Georgia road was stopped at Windsor, S. C., on the night of Feb. 28, by a mob, who took from the train a negro prisoner and lynched him.

The transportation of mails between the main and branch post offices in Brooklyn, N. Y., is now done entirely by electric street cars, and all the wagons used in this service have been laid aside.

The Colorado Board of Equalization has asked for a statement of private owners' freight cars used in that state, with a view to assessing them for taxation. It is estimated that an average of 400 such cars are in use in that state and none of them has ever paid taxes there.

The Railroad Young Men's Christian Association building at Forty-first street, West Philadelphia, is to be enlarged by the addition of a hall to seat 1,350 persons. The addition will cost $30,000, one-third of which has been promised by the Pennsylvania Railroad Company.

The Supreme Court of the United States has sustained the law of the state of Connecticut forbidding the transporttion of certain kinds of game beyond the state limits. It had been held that the law was invalid as being an attempt to regulate interstate commerce, but the majority of the court rejects this view. Justices Brewer and Harlan dissented.

On Friday last about 30 men were arrested for jumping off a moving passenger train of the Chicago & North Western at Kinzie street, Chicago. There is a city ordinance forbidding all persons to jump off a moving train, and it is said that the road caused the arrest of these persons as a means of stopping the practice of getting off incoming trains (at dangerous places) before they reach the station.

The United States Government has filed a suit against the Southern Pacific, the Central Pacific and other corporations and individuals to the number of 60 defendants, in Carson, Nev., attacking the title to nearly the entire town of Wadsworth, including the railroad property and buildings, with a total value of $800,000. The individual defendants are persons who have leased or purchased lands from the Southern Pacific. The government alleges that the railroad company took possession under a grant that was null and void, from the fact that the lands in dispute were already occupied

On Feb. 27 the Lehigh Valley ran a special train from Jersey City to Buffalo, 448 miles, in 10 hours. The train consisted of one engine and four cars, two of them Pullman sleepers. On the following day the train made a similar run back to Jersey City. This trip seems to have been made with a view to preparing a schedule for a fast regular passenger train. It is said that about one hour was consumed in stops on the road, and that the total time, 10 hours, was half an hour less than had been scheduled for the train.

America is becoming a nation of teetotallers. If the reader does not believe it let him look at the list of states where the citizens have formally voted that way. We find this list quoted from the bill-of fare of a Pullman dining car. A note on the card says:

"Wines and liquors will not be sold in Alabama, Florida, Georgia, Iowa, Indian Territory, Kansas, Maine, Mississippi, New Jersey, Ohio, South Carolina, Tennessee, Texas and Wyoming. No wines or liquors to be sold on Sunday in any states having the prohibitory Sunday laws." As a slight ray of hope in this dark picture we will remind the thirsty reader that these states are not so big in population as they are in territory. If square miles ruled, we should all go to the bow-wows; but they don't.

"Guaranteed Neutrality."

The steamer Kantzler, from Hamburg for Delagoa Bay, which grounded in the Suez Canal on Wednesday, was floated on Saturday, but in the meantime she had detained nearly 50 steamers. This accident illustrates the facility with which a canal can be disabled in the event of a war. A few weeks ago it looked as if Delagoa Bay would be the destination of a large English naval force, whose purpose was regarded as hostile by the German Emperor. What would have seemed like an accident might easily have sunk a large German merchant steamer in the canal in front of the English fleet, and the raising of a large vessel intentionally sunk would have been a much more serious operation than pulling off the bank a steamer which had accidentally run aground. No international agreement to neutralize a canal could be depended on to avert this sort of wilful accident when vast issues depended on closing the canal to a nation, not perhaps in a state of war but evidently manouvering to get its war ships into a good position before committing an act of hostility.—*Journal of Commerce.*

Horseless Carriages in Paris.

The Prefect of the Seine was recently applied to for permission to put horseless carriages into current use in Paris, along with the public carriages of that city. The special form of motor involved is a petroleum motor. The Chief of Police reports to the Prefect that he sees no objection to granting the authority. He believes, however, that these petroleum carriages should be placed at the end of the cab stands, in order not to interfere with the free movement of the ordinary carriages in taking their places on the cab stands, and that the two kinds of vehicles should not be mixed in the line on one stand.—*Le Journal des Transports.*

Pope's Iron-clad Ticket.

Col. E. B. Pope, Western Passenger Agent of the Chesapeake & Ohio, has designed a round-trip ticket for the purpose of preventing the unauthorized use of the return portion by other than the original purchaser. The intention is to have the conductor of the last-going train take up the return portion and issue in lieu of it the "conductor's receipt to original purchaser," which does not show the stamp of the issuing agent nor the name of his station, but only the general office stamp of the initial line; neither does it show the date of issue, the final limit, the return route of the ticket, the name and signature of the original purchaser, nor anything but the form and number of the ticket and the name of the initial line.

The return portion of the ticket is to be deposited by the conductor with the ticket agent of the terminal line, to be by him held until called for by the original purchaser. The ticket agent will keep the tickets of each initial line in a package by themselves, and all of the issue of each initial line being in numerical order can be readily found when wanted. The conductor's receipt which the ticket agent will get from the passenger when he delivers the return ticket will be all the voucher the ticket agent will require to show that the passenger has received his return ticket. Anyone to whom the conductor's receipt might be offered for sale would be obliged to accept the original purchaser's unsupported word for the original point of purchase, the name and signature of the original purchaser, the final limit, the return route of the ticket, and would then have to counterfeit the unseen signature of the original purchaser so that it would pass muster with the ticket agent. It is not thought that anyone would purchase a conductor's receipt at any price, and the railroads could, therefore, grant a lower rate and more liberal limit on the ticket, and the passenger, besides being benefited in this way, would be saved the trouble of being obliged to go to the ticket office to deposit his ticket. It has been suggested that the original purchaser would have a legal right to refuse to allow the conductor to take up his return ticket. This could be provided for by fixing a very short limit on the ticket, which limit would be extended by allowing the conductor to lift the ticket and deposit it with the ticket agent.

Lectures at the Worcester Polytechnic Institute.

Mr. C. T. Mendenhall President of the Worcester Polytechnic Institute, has arranged a course of lectures by non-residents. The following is a partial list of those who have promised to give lectures in the course: J. M Allen, Hartford, Conn.; John A. Brashear, Pittsburgh, Pa.; E. L. Corthell, New York City; Charles B. Dudley, Altoona, Pa.; B. E. Fernow, Washington, D. C.; J. Evarts Greene, Worcester, Mass.; Almon Gunnison, Worcester, Mass.; William Kent, New York City; Charles F. Maybery, Cleveland, O.; Daniel Merriman, Worcester, Mass.; Edward S. Morse, Salem, Mass.; Henry G. Prout, New York City; E Harlow Russell, Worcester, Mass; W. T. Sedgwick, Boston, Mass.

Disastrous Explosion of Torpedoes.

The terrible explosion of dynamite at Viedendorp, South Africa, near Johannesburg, on Feb. 19, killing over 100 people, is said to have been due to a shock sustained by a freight car which was being switched at Braamfoutien. The car contained some detonaters (torpedoes for signaling), and they were exploded by the shock of the collision; and the shock of this explosion exploded the dynamite, which was in other cars standing near by.

Master Car Builders' Convention.

Members of the Master Car Builders' Association are reminded by the Secretary that they should make early application for rooms needed at Congress Hall, Saratoga, far the period of the Master Car Builders' Convention, commencing June 17, 1896. Application should be made to H. S. Clement, Manager Congress Hall, Saratoga, N. Y. The rates are as follows: Single rooms, $3 per day; double rooms, one person, $4 per day; double rooms, two persons (each), $3 per day.

A Big Overcharge Voucher.

Press dispatches from Harrisburg, Pa., announce that the Pennsylvania Railroad has agreed to pay $130,000 in settlement of the suits recently brought against the company by the McCormick Company, the Charles L. Bailey Company, Central Iron Works, Harrisburg Rolling Mill Company, Harrisburg; the Columbia Rolling Mill Company, of Columbia, and the Steacy Denny Rolling Mill Company, of York. The complaints were based on the alleged violation of the long and short haul clause in the constitution of the state of Pennsylvania; and, as recently noted in these columns, the highest court of the state affirmed that clause, holding that the enforcement of the rule in freight transportation did not require a specific statute by the legislature. The overcharges were on coal received by the plaintiffs, who complained because coal was carried to Philadelphia at lower rates. They claimed $190,000.

Railroad Taxation in New Jersey.

Propositions to change the basis of railroad taxation are prominent in the New Jersey Legislature this year. The situation in Jersey City is described by the New York *Herald* as follows:

New Jersey was among the very first states in which railroads were built, and among the inducements offered by the state was exemption from taxation. As time went on and the railroads began to accumulate valuable property, which was taken out of the ratables, the taxpayers began to complain and an agitation sprung up, which culminated, in 1884, in the passage of the Railroad Taxation law. This provides that a State Board of Assessors shall tax railroad property, except the right of way and passenger depots, at 1½ per cent., one-third of this to be paid into the State Treasury and the balance to the municipalities. This law was a compromise. The people of Hudson County wanted the roads taxed at the same rate they were taxed, and only yielded when it became evident that they were in danger of getting nothing at all. Some of the railroads would not accept the law, claiming that their charters explicitly exempted them from taxation, and to this day the New Jersey Central pays its taxes under protest.

The railroads own 1,185 acres out of a total of 10,325 in Jersey City. The total valuation of the city is $80,000,000, $22,500,000 of which is owned by railroad companies, and that does not include the passenger depots, which are exempt and which are valued at $10,000,000. Thus $32,500,000 of ratables are taken out of a total of $80,000,000, leaving the other $47,500,000 to bear almost all the burden

of maintaining the municipality. The citizens of Jersey City claim that this is driving them to bankruptcy, and that the only remedy is the passage of some law compelling the roads to pay at the local rates on the $22,500,000. The cities debt is about $16,000,000. The greatest opposition to the Equal Taxation bill, outside of the railroads themselves, comes from the rural districts, where there is no railroad property except the right of way, and from the 19 townships where there isn't even a roadbed. There is now no state tax, the money received from the railroads and other corporations being sufficient to allow the state to live in luxury. In order to meet that objection, the Queen bill provides that the one-half of one per cent. now paid into the state be continued and the difference between that and the local rate be given to the municipalities.

Mr. James B. Vredenburg, for the Pennsylvania Rail road, arguing before the legislative committee, said: The Pennsylvania is already paying the state over $400,000 a year for taxes. Of this amount about $100,000 is known as local tax. Jersey City gets altogether from his company $130,000 a year, exclusive of an amount for water that ranges from $35,000 to $40,000. The company owns 189 acres of land in Jersey City, which is about $\frac{1}{10}$ of the city's entire territory, but the company pays $\frac{1}{5}$ of all the tax collected by the city. The railroads, Mr. Vredenburg contended, sustained more than a fair share of the tax burden. They pay more than individuals do, receiving less in the way of protection and results. The railroad companies have to pay on enormous good-will assessments and also on high assessments for personal property. In Jersey City personal property escapes taxation and good will is not assessed at all so far as individuals are concerned. It was also true that no deductions for debt were allowed to the railroad companies. Before 1885 the railroads paid the State $500,000 for taxes; now they cover into the treasury of the State about $1,500,000 per year. The Pennsylvania has always paid cheerfully and without litigation the amounts levied by the authorities, but under this bill confiscation is proposed and the company is obliged to fight. A few years ago when the tax rates were fixed the State Board of Assessors announced that they were equitable and just, but now without any change in the values it is proposed to double the rate. In some localities, notably Cape May and Somerset, it is proposed to make the companies pay 40 times as much as they do now. If the bill passes, the companies will fight for justice so long as the courts are open to them.

Coal Barges for the New York, Ontario & Western.

The New York, Ontario & Western has ordered the construction of four coal barges for Long Island Sound and New England traffic. Two of the barges will have a capacity of 1,500 tons each and two of 750 tons each. Coal will be delivered into the company's barges from the company's terminals at Cornwall-on-the-Hudson. At present part of the tonnage is sent over the West Shore tracks to Weehawken and thence by water, and part is forwarded over the New York & New England. The barges will be able to handle between 75,000 and 100,000 tons of coal annually, and will enable the Ontario & Western to transport its coal in its own cars and barges from the mines to the market.

The London & North Western.

The London & North Western report for the last half year is devoid of sensational topics. The huge increase of upward of a quarter million sterling in the gross receipts looks like a Budget surplus. More than two-thirds of this, or £178,977, went into the profit balance, thus increasing the dividend to the rate of 7⅛ per cent. per annum, against 6¾ in the last corresponding half-year. The improvement in receipts was of an all-round description, passengers contributing £144,775 and merchandise and live stock £98,896. With an increase of 562,000 in the train-mileage, coal cost only £1,000 more. The proprietors, therefore, have got the full benefit of the improvement in business, and taking the solid manner in which the increase has been earned, the current state of trade and the absence of any disquieting circumstances affecting the company, we doubt if the London & North Western ever issued a more satisfactory report. The total capital expended is now nearing 106 millions sterling, and the normal capital expenditure of each half-year varies between three and four hundred thousand. The capital expenditure in sight is nearly four millions, for which the existing capital powers are sufficient.—*Herapath's.*

European Railroad Notes.

The length of the new line opened in Spain last year was 402½ miles. The principal new line opened during the year was the Valladolid and Ariza (Madrid, Saragossa and Alicante), 159¾ miles in length.—*Herapath's.*

At a recent meeting of the Society of French Civil Engineers in Paris, M. Henri Varennes, a leading engineer of the Orleans Railway, stated that his company, in order not to be distanced by the Northern and the Paris, Lyons & Mediterranean, had decided that on June 1 next, the beginning of the summer service, the morning and evening expresses to Bordeaux would cover the distance of 376 miles in seven hours (53.7 miles an hour, a trifle faster than the Empire State Express). The carriages and engines will be those at present in use. The new fast expresses will stop only at Orleans, Tours, Poitiers and Angouleme.

The *Railway News* says that the race to the North is to be resumed at the beginning of the tourist season, and cites as evidence the fact that the Caledonian Company has just turned out the first of six new racers. It is a splendid engine. It is named the "Dunalastair," and is said to be the most powerful locomotive ever built in Britain. In length it is 34 ft., the tank is 19 ft., and the driving-wheel 6 ft. 6 in. The weight with coal and water is 87 tons.

New York City Dock Improvements.

Assemblyman Wilson has introduced into the Legislature at Albany five bills pertaining to improvements in the city docks of New York. In order to complete the improvements between Charles and Gansevoort streets, plans for which have been approved by the Sinking Fund Commission, the city must acquire property and wharfage rights between Bethune and Gansevoort streets, which, it is estimated, will cost, with the existing structures, about 2,250,000. This, together with the cost of property between Bethune and Charles streets, amounts to about $4,000,000. To obtain the bulkhead rights between Seventeenth and Twenty-third streets will cost about $1,000,000. The condemnation of other property needed by the improvement makes necessary the expenditure of about $9,000,000 for property and construction purposes. One of the bills above mentioned provides for $6,000,000 additional dock bonds, not more than $2,000,000 to be expended in any one year. Another provides that the purchases mentioned above shall be made within four months after the Commission of Estimate and Assessment shall have filed their oaths of office. An important feature secured by the completion of these improvements will be six new piers on the North River for the largest ocean steamers.

LOCOMOTIVE BUILDING.

The Staten Island Rapid Transit road is in the market for a few locomotives.

The Seaboard Air Line has ordered several engines from the Richmond Locomotive Works. It is reported that additional orders will be given out shortly.

The Ohio River road, of West Virginia, has ordered three 10-wheel 50-ton locomotives from the Brooks Locomotive Works. The engines are to be built within 60 days.

CAR BUILDING.

The Central of New Jersey is asking bids on 1,000 freight cars.

The St. Charles car works have begun the delivery of 500 cars building for the Toledo, St. Louis and Kansas City.

The Seaboard Air Line will soon give an order for considerable additional rolling stock, principally heavy freight cars, to be used on the North Carolina divisions.

The Ensign Mfg. Co., of Huntington, W. Va., has the order from the Ohio River road for 300 box cars. They will be 34 ft. long and of 30 tons capacity each, equipped with air-brakes and automatic couplers.

The contract for the Lehigh Valley cars will not be awarded before April 1. All the cars to be built will be standard coal cars of 60,000-lbs. capacity. The number to be built has not yet been decided. Bids have been asked on 1,000 and 2,000.

The Chicago, Rock Island & Pacific has placed an order with the Pullman Car Co. for seven new sleeping cars. The railroad company owns one-half interest in all Pullman cars operated on its road, and will bear one-half of the cost of construction of these new cars.

BRIDGE BUILDING.

An account of damage to bridges by the recent floods will be found in another column.

Atlanta, Ga.—A bridge is needed over Peachtree Creek, near this city and the County Commissioners have ordered the preparation of plans for the same.

Baltimore, Md.—The City & Suburban (electric) Railway Company intends to build a viaduct on Eastern avenue extended, to cross the tracks of the Union and the Baltimore & Ohio railroads.

The Traction Company in its proposed extension across the Spring Gardens proposes to cross the tracks of the Baltimore & Ohio on Ostend street by a viaduct.

Captain Wyatt Owen has been given permission to construct a bridge over the west branch of the Patapsco River, near this place.

Buffalo, N. Y.—Bids will be received until March 11 for an overhead foot-bridge crossing the tracks of the New York Central at Franklin street. R. G. Parsons is Secretary of the Department of Public Works.

Canton, O.—The contract for the Ninth street bridge at this place has been awarded to the Wrought Iron Bridge Co., their contract price being $8,370.

The Canton Bridge Co., of this place, has secured the contract for the highway bridge on the Laiblin road, their bid being $6,362.

Castle Rock, Wash.—Surveys are being made by the County Surveyor for a bridge across the South Toutle near this place.

Charleston, W. Va.—The bridge work at present under contemplation at this place consists of one new bridge and repairs on two other bridges.

Chicago, Ill.—The annual report of Commissioner of Public Works Kent condemns about eight city bridges, it being stated that they must either be rebuilt or closed.

Cincinnati, O.—The plans for a steel viaduct on Mitchell avenue have been approved by the State Engineer.

Cleveland, O.—The old Willow street bridge will be removed at once. The Director of Public Works has been requested to report on the advisability of building a tunnel instead of the proposed new bridge.

Deckertown, N. J.—The bridge over the Papakating River will soon be replaced by a steel structure.

Decorah, Ia.—Bids will be received until April 9 for materials and erection of all steel bridges from 20 ft. to 60 ft. long which will be needed by the county during 1896. O. C. Johnson is County Auditor.

Denver, Col.—State Engineer Sumner has made the locating surveys for a bridge over the Platte River near Orchard. It will be 1,040 ft. long and will cost about $4,000.

De Soto, Mo.—The city is contemplating building a bridge across the Joachim Creek.

Elkhart, Ind.—A bridge will soon be built at Simonton street over Christiana Creek.

Elk Point, S. D.—Bids will be received until March 12 for repairing the Calhoupe bridge over the Big Sioux River. The repairs consist of a new pier composed of two steel cylinders 5 ft. in diameter and 30 ft long, with a plate and angle web. Address A. P. Asbyeld, County Auditor.

Fergus Falls, Minn.—The contract for a bridge across the Red River, two miles from this place, has been awarded to the Wrought Iron Bridge Co., of Canton, O., their bid being $1,793.

Franklin, Tenn.—The Youngstown Bridge Co., of Youngstown, O., has secured the contract for the new 150-ft. steel span which is to replace the old wooden bridge over the Big Harpeth River at the foot of Maple avenue, this place. Their bid was $6,490. The structure will be a highway bridge, with a 16-ft. roadway.

Freemansburg, Pa.—Petitions for and against an overhead bridge across the Lehigh at this point have been presented to the County Commissioners. The Lehigh Valley has offered to bear the extra expense of building the bridge over its tracks instead of on grade.

Galveston, Tex.—Bids will be received until March 9 for a bridge across Clear Creek, connecting Galveston and Harris counties.

Glasgow, Va.—The Chesapeake & Ohio will build a bridge across the North River at this place. Connection between the main line of the C. & O. and the Lexington Branch will thus be made. It has been decided to make Glasgow the junction, instead of Balcony Falls, as heretofore.

Ironwood, Mich.—A steel bridge has been recommended at Suffolk street, and will probably be built this spring. C. E Erickson is City Clerk.

Junction City, Kan.—Bids will be received until April 13, for an iron highway bridge 400 ft. long, at Milford, in Geary County. Address W. R. Spurlock, as above.

Knoxville, Tenn.—We noted some time ago that plans were being prepared for a bridge across the Tennessee River at Gay street. These plans, we are informed, are now ready for inspection by bidders.

Livingston, Mont.—It is reported that O. E. Peppard, of Missoula, Mont., has secured the contract for building the bridge over the Yellowstone River at this place.

Napa, Cal.—Bids are wanted until April 15 for building a stone bridge across Putah Creek, in Monticello road district No. 11. Address N. W. Collins, Clerk.

New York.—Secretary Lamont approved Feb. 28 the plans recommended by the Board of Engineer officers for the new East River Bridge. The plans provide that the minimum height of the structure shall be 135 ft in the center at mean high tide and for a distance of 200 ft. on each side of the center. The pier heads are to be 117 ft. high.

Norman, Ont.—We are informed that the province of Ontario will build a bridge over the Winnipeg River at this place during the spring.

Ottawa, Ont.—Bids for the construction of the second section of the Peterborough and Lakefield division of the Trent Valley Canal will be received until March 21. In this work an iron bridge 224 ft. long will be built at Nassau. At Little Lake it is proposed to place the hydraulic lift lock, with a lift of 65 ft. A swing bridge will be required at Warsaw road, and at the Norway road, a high level bridge spanning the canal will be required. A second swing bridge will be built at Ashburnham.

Perry, Okla.—The construction of two bridges across Black Bear Creek and two others across Red Rock Creek, near this place, has been authorized. Address A. C. Hinde.

Ridgewood, N. J.—Bids will be received by the Committee of Chosen Freeholders of Bergen County, on March 16, at 2:30 o'clock p. m., for constructing a 25 ft. span Melan arch bridge over Saddle River, Ridgewood avenue. T. V. Terhune, Chairman of Committee, has plans and specifications on file.

St. Thomas, Ont.—The contract for the new bridge west of Belmont has been awarded to the Central Bridge Company, of Peterborough, at $598 99. Geo. Pousford of St. Thomas has received the contract for the concrete abutments at $599.

Saratoga Springs, N. Y.—The Superintendent of Public Works of this place has received authority to build a bridge in the town of Northumberland, across the Champlain Canal.

Spokane, Wash.—The people of Kamloops have petitioned for a bridge over the Thompson River at the present ferry crossing.

Springwells, Mich.—Bids were opened in the office of Chas. C. Bothfield, Constructing Engineer, Detroit, Mich., on February 25th, for the construction of the sub- and superstructure of the 198 ft. draw span over the Rouge River at Fort Street, between this place and Ecorse, as follows: Toledo Bridge Co., $22,800; Youngstown Bridge Co., $21,232; Detroit Bridge & Iron Works, $19,800; King Bridge Co., $19,390; Wrought Iron Bridge Co., $19,994; Massillon Bridge Co., $24,500.

The contract has been awarded to the lowest bidder, the King Bridge Co.

Statesville, N. C.—The 125-ft. iron bridge on the line of the Western North Carolina, crossing Buffalo Shoals Creek about nine miles from this place, was recently badly damaged by fire. It will be replaced by the Southern Railway, which operates the Western North Carolina.

Traverse City, Mich.—Plans and specifications for a new bridge on South Union street are now being prepared by the City Engineer.

Troy, N. Y.—A highway bridge 75 ft. long with an 18 ft. roadway and two 6-ft. sidewalks is proposed at this place.

Uniontown, Pa.—The County Commissioners have approved the report of the viewers for a free bridge over the Yough River between Connellsville and New Haven. The bridge will be built immediately unless the Supreme Court should decide against it.

Washington, D. C.—The Senate Committee on Commerce has ordered a favorable report on the Detroit Bridge bill with an amendment regarding the rights of roads other than the Michigan Central, using the bridges. The provisions relative to the piers of the proposed bridge are unchanged. They provide for two piers in the river, with a clear channel of not less than 1,100 ft. Clear head room available for vessels is fixed at not less than 140 ft. at the mean stage of water.

Judge Terry, of Arkansas, introduced in the House, Feb. 26, a bill for a free bridge over the Arkansas River between Little Rock and Argenta.

Westfield, Mass.—There were 17 bids for the iron bridge to be erected by the town across the Westfield River here, the R. F. Hawkins Iron Works, of Springfield, being the lowest bidders, at $6,695. That firm was awarded the contract on March 3. The abutments and pier will cost about $10 000. The bridge will be about 100 t. long.

Westmoreland, Kan.—Bids will be received until April 13 for an iron bridge of 45 ft. span with a 14-ft. roadway. Frank Davis is County Clerk.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, $2 per share, payable March 31.

Camden & Atlantic, semi-annual, 2½ per cent. on the preferred stock, payable March 16.

Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable April 1.

Maine Central, $1 50 per share, payable April 1.

West Jersey, semi-annual, 3 per cent. on the common stock, payable March 16.

West Jersey & Atlantic, 3 per cent., payable March 16.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Canadian Pacific, annual, company's office, Montreal, Canada, April 1.

Missouri Pacific, annual, company's office, St. Louis, March 10.

Oregon Short Line & Utah Northern, annual, Hooper Building, Salt Lake City, Utah, March 18.

Pennsylvania, annual, Musical Fund Hall, Locust street, Philadelphia, Pa., March 10. The annual election will be held at the Broad Street station, March 24.

St. Lawrence & Adirondack, special, company's office, Montreal, Canada, March 9.

St. Louis, Iron Mountain & Southern, annual, company's office, St. Louis, March 10.

Southwestern, special, company's office, Montreal, Canada, March 9.

Tennessee Coal, Iron & Railroad, annual, company's office, Tracy City, Grundy County, Tenn., March 11.

Texas & Pacific, annual, company's office, 195 Broadway, ew York, March 18.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its next annual convention at Niagara Falls, beginning on Sept. 8.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago. Mr. George M. Basford, is secretary, The Rookery, Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *mer[illegible]y of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds in formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

Western Society of Engineers.

A meeting of the Society was held in the society's rooms, 1737 Monadnock Block, Chicago, on Wednesday evening, March 4. A paper, "Relative Cost of Rock Excavation by use of the several devices in operation on the Chicago Drainage Canal," was presented by Mr. William G. Potter, M. W. S. E.

American Society of Civil Engineers.

A regular meeting was held at the Society House on Wednesday, March 4, 1896, at 20 o'clock. A paper by Leopold Eidlitz, Esq., entitled, The Strength of Pillars —An Analysis (see *Proceedings* for February, 1896, already published), was presented and discussed. After the meeting a collation provided by subscription of resident members was served.

Central Railway Club.

The next meeting will be held at the Hotel Iroquois, Buffalo, on Friday, March 13, 1896, at 2 p. m.

Reports.—Air-Brake Testing and Inspecting Plants. Committee: H. C. McCarty, Pennsylvania Company; J. R. Petrie, Buffalo; J. A. Chub, Michigan Central; F. H. Ball, Lake Shore & Michigan Southern. Tool Rooms in Machine Shops and Best Methods of Handling Them. Committee: S. Higgins, F. B. Griffith and John Mackenzie.

Discussion.—Report of committee on what is the proper method of stenciling the light weight on freight equipment cars, with a view of having the stenciled weight agree with the actual weight after the lumber in the cars has dried out? Report of committee on safe ending of boiler flues. Report of committee on injury caused by the drippings of salt water from refrigerator cars to track, bolts, trucks, etc. Topical questions submitted by members.

Association of Engineers' of Virginia.

The annual meeting of the Association was called to order at Roanoke, Va., January 25, 1896, by the President, Mr. J. C. Rawn, who submitted the following report from the Board of Directors.

The bad financial conditions which obtained during 1893 and 1894 had so seriously affected all interests, but most particularly such as engineer swere dependent upon for a livelihood, that at the close of 1894 a large number of our members were without engagements and consequently without the financial support necessary to maintain themselves. As a result of this condition many of our members found it impracticable to meet their obligations to this association, and either their resignations were accepted or they were dropped from membership for delinquency. Your Board of Directors, realizing that our revennes were not sufficient to meet the expenses attendant on the publication of our papers, were considering the best means to solidify and strengthen what was remaining of the association, the membership having decreased nearly 70 per cent., when the opportunity to become a member of the Association of Engineering Societies presented itself and was accepted, as your Board of Directors believed that by such action a solution of our difficulties would be brought about.

The results have entirely justified the action of the Board, all members being satisfied with the amount and character of the literature and the reduction in expenses and dues, so that at this time our association is out of debt and has every promise of being able to maintain itself without financial embarrassment. At the date of our last annual meeting our roll contained 35 active and two honorary members, to which there has been added during the past year three active members, the present membership being 38 active and two honorary members. During the year there have been held five meetings of the Board of Directors and seven meetings of the association. Six papers have been read and five informal discussions held.

The election of officers for the ensuing year was announced and the President appointed as scrutineers of the ballots Messrs. C. S. Churchill, H. A. Gillis and M. E. Yeatman, who reported the following as elected: President, D. C. Humphreys; Vice President, G. R. Henderson (to serve two years); Secretary, John A. Pilcher; Treasurer, James Schick; Directors (to serve three years), Herman Crueger, R. A. Marr and J. C. Rawn.

Mr. H. A. Gillis presented to the association a communication from Mr. L. S. Randolph, calling attention to a bill in Congress, H. R. 3618, for the purpose of increasing the efficiency of the Navy, and asking the association to take some action in regard to it. On motion of Mr. Churchill to appoint a committee of three to urge this matter upon the attention of the members of Congress from Virginia, the President appointed on such committee Mr. H. A. Gillis, Mr. C. S. Churchill and Mr. G. R. Henderson.

Mr Gillis reported a road improvement bill in the Virginia Legislature, and on motion this same committee were instructed to use the influence of this association to have it passed.

Mr. William M. Dunlap read a paper on Assessments for Municipal Improvements, pointing out that none of the simple methods in use, whether by frontage, area or valuation, would be found equitable in all cases, but recommending a combination of two or more of these. The paper brought out considerable discussion, and on motion was referred to the Publication Committee.

On motion of Mr. Yeatman the thanks of the association were tendered Mr. J. C. Rawn, the outgoing President, for his efficient services during the year, which motion was amended so as to include in the thanks the Secretary and Treasurer.

On motion of Mr. White the thanks of the association were voted the Norfolk & Western Railroad for the use of their offices as a meeting place during the year.

PERSONAL.

—Mr. Charles A. Beach, Superintendent of the Buffalo Division of the Lehigh Valley Railroad, has resigned and Trainmaster Lucas Van Allen has been appointed Acting Superintendent.

—Mr. Norman Elliot, son of Mayor Elliot, one of the proprietors of the National Paint Works of Williamsport, Pa., and Mr. J. Irving Hornbeck, of New York, have taken positions as traveling salesmen for the National Paint Works.

—Mr. F. A. Bloomer, Superintendent of the Toledo, St. Louis & Kansas City, has resigned to take effect on March 15. He will be succeeded by Mr. J. W. Sherwood, formerly Division Superintendent of the Cleveland, Cincinnati, Chicago & St. Louis.

—Mr. G. F. Randolph, late Traffic Manager of the New York & New England road, has been appointed to succeed Mr. William Duncan as Traffic Manager of the Baltimore & Ohio Southwestern Railway. He will not be a Vice-President of the company, which title Mr. Duncan held. His headquarters will be in Cincinnati.

—Mr. William J. Morden, of Chicago, recently the head of the Morden Frog & Crossing Works, died at his home in Chicago last week from blood poisoning caused by a parrot's bite. The plant of the Morden Frog & Crossing Works was started about 1880 at Chicago. In 1884 the present large plant at South Chicago was erected.

—Mr. De Courcy May has been appointed General Manager of the Dickson Mfg. Co., of Scranton, Pa., in charge of all the operations, and entered upon his duties March 3. Mr. May was Superintendent of the I. P. Morris Co., of Philadelphia, for a number of years, and has had a wide experience in engine building. He was lately Engineer of the Cataract Construction Company, of Niagara Falls.

—Mr. Charles L. Colby died of apoplexy on Feb. 27 at Newton Center, Mass., just after delivering an address at a church anniversary. He was for many years, beginning about 1870, identified with the Wisconsin Central. He was interested in its construction, and was subsequently the President. He was prominent in the development of the Gogebic Mining District. In 1890 he returned to New York City, and since that time had been connected with railroad and mining interests in the West. Mr. Colby was a director of the Farmers' Loan & Trust Company and the Mercantile National Bank and of the Northern Pacific, and a Fellow of the American Society of Civil Engineers.

—The friends of Sol Haas (until recently the assistant to President Spencer, of the Southern Railway, in charge of traffic, when he retired to private lifeafter nearly 25 years in railroad service) assembled at his residence in Washington one night last week and presented him with a handsome silver service as a testimonial of esteem. Besides the Presentation Committee, which consisted of W. A. Turk, General Passenger Agent, Washington; S. H. Hardwick, Assistant General Passenger Agent, Atlanta; R. D. Carpenter, General Agent, New York; F. B. Price, Freight Agent, Philadelphia, W. H. Green, General Superintendent, Washington, and J. M. Culp, Traffic Manager, there were present some 30 others holding important positions in the Southern Railway service.

—Mr. W. H. Canniff has been appointed General Manager of the Lake Shore & Michigan Southern, Mr. G. J. Grammar, Traffic Manager, and Mr. P. S. Blodgett, General Superintendent. Mr. Canniff has been General Superintendent since 1890, and was previously Division Superintendent on the Lake Shore for many years. Mr. Blodgett, like Mr. Canniff, has been a Division Superintendent of the Lake Shore for many years. He has been Assistant General Superintendent since 1892. Mr. Grammar has been with the Lake Shore only since last October, when he became General Freight Agent. He has had a large experience as a traffic officer. He was Assistant Traffic Manager of the Chesapeake, Ohio & Southwestern, and Traffic Manager of the Chicago & Eastern Illinois, Louisville, Evansville & St. Louis, and Evansville & Terre Haute, when those roads were associated.

ELECTIONS AND APPOINTMENTS.

Atchinson, Topeka & Santa Fe.—J. Forster, Assistant Master Mechanic of the road at Argentine, Kan., has been appointed Master Mechanic of that road at La Junta, Col.

Bedford Belt.—E. S. Walker has been appointed Superintendent, with office at Bedford, Ind., vice D. S. Lermond.

Camden & Atlantic.—The following directors were elected last week: George B. Roberts, William L. Elkins, Henry D. Welsh, William E. Read, Sr., William C. Dayton, Crawford Miller, Enoch A. Doughty, John B. Hay, Samuel Read, W. J. Sewell and Charles E. Pugh.

Canadian Pacific.—W. R. MacInnes has been appointed General Agent of the freight department, with office in Chicago, in place of J. F. Lee, who will attend exclusively to the passenger traffic.

Chicago, Burlington & Quincy.—George H. Branston has been appointed New England Passenger Agent, with headquarters at No. 306 Washington street, Boston, succeeding H. D. Badgley, resigned.

Cincinnati, Portsmouth & Virginia.—T. D. Rhodes has been appointed assistant to the President of this company, and of the Ohio River & Charleston, with office at Cincinnati, O.

Columbus, Sandusky & Hocking.—B. H. Akin has been appointed Acting General Freight Agent, to succeed W. W. Daniel, General Freight Agent, resigned.

Cooperstown & Charlotte Valley.—The office of General Manager of this company has been abolished. All reports relating to freight and passenger accounts should be addressed to F. E. Whitbeck, Secretary and Auditor, Cooperstown, N. Y., and inquiries for rates should be addressed to R. W. Roundy, General Traffic Manager, Cooperstown Junction, N. Y.

Hannibal & St. Joseph.—Charles A. Chase, Master Mechanic at St. Joseph, has been appointed General Master Mechanic of this road and the other Missouri lines of the Chicago, Burlington & Quincy, and I. N. Miller, of Brookfield, Master Mechanic at Hannibal. Mr. Wilbur will be succeeded as General Foreman at Brookfield by N. Chase Lamb, of St. Louis, and Mr. Lamb by Joseph Clough, of Kansas City. The changes took effect March 1 and are the result of the death of N. J. Paradise, General Master Mechanic.

Indiana, Illinois & Iowa.—Peter Maher has been appointed Master Mechanic, vice L. H. Miller, resigned.

Interoceanic Railway of Mexico.—W. T. Ingram, formerly Division Engineer, is now Engineer of this road, with office at City of Mexico.

Lehigh Valley, Auburn Division.—Murray B. Auger has been appointed Train Master in charge of E. C. & N. R. R., with office at Cortland, N. Y.

Lindsay, Haliburton & Mattawa.—The officers of the company are: President, Maj. Samuel Hughes, M. P., Lindsay, Ont.; Vice-President, Hon. John Dobson, Lindsay; Secretary; William McArthur, Fenelon Falls, Ont.; Treasurer, John H. Brandon, Fenelon Falls.

Mobile & Burmingham.—The General Passenger Department of this company has been moved from Mobile, Ala., to Selma, Ala. The office of District Passenger Agent at Mobile has been abolished. Mr. J. S. Taylor has been appointed General Agent at Mobile, Ala., representing the Freight and Passenger Departments at that point.

Necedal Junction, Tomah, Richland Center & Mont fort.—The officers of this new Wisconsin company are as follows: C. E. Quigg, President; G. W. Reigle, Vice-President; D. J. Aller, Secretary, and R. H. McMullen, Treasurer. The headquarters are at Tomal, Wis.

Northern Central.—At the stockholders' meeting in Baltimore last week the following directors were elected: George B. Roberts, J. N. Hutchinson, B. F. Newcomber, Louis W. Hall, E. B. Parsons, John P. Green, Harry Walters, Henry James, J. D. Cameron, Luther S. Bent, Henry D. Welch and N. Parker Shortridge. The total

vote was 107,166 shares. The Board organized by electing George B. Roberts President. Mr. Roberts resigned as a director and A. J. Cassatt, of Philadelphia, was elected to fill the vacancy. The other officers were re-elected.

Oregon Railway & Navigation Company.—F. G. Wheeler has been oppointed Purchasing Agent of the company, with office at Portland, Or.

Rio Grande & Eagle Pass.—Felix C. Murphy has been appointed General Freight and Passenger Agent of this company, with headquarters at Laredo, Tex.

St Clair, Madison & St. Louis Belt.—The present officers of this company operating the Alton bridge are as follows: E. F. Leonard, President; Edwards Whitaker, Vice-President; C. Hodgman, Treasurer, with office at St. Louis, Mo.; J. E. May, Superintendent and General Agent; J. C. Bramhall, Passenger Agent. The general offices are at Alton, Ill.

Valley (Ohio).—The traffic department of the road has been reorganized, the jurisdiction of the Pittsburg & Western officials being extended over this road. General Freight Agent W. L. Cromlish, of the P. & W., is made Assistant Freight Agent of the Valley road, and Assistant General Passenger Agent C. W. Bassett, of the P. & W., is appointed to the same office on the Valley. Acting General Freight and Passenger Agent J. P. Leingang, of the Valley road, is made Assistant General Freight and Passenger Agent, with office at Cleveland. The headquarters of the other officers remain at Pittsburgh.

Wheeling & Lake Erie.—W. R. Setchel has been appointed Master Mechanic of the road, to succeed Mr. O. P. Dunbar, with headquarters at Norwalk, O. Mr. Setchel is the son of Mr. J. H. Setchel, General Agent of the Pittsburgh Locomotive & Car Works.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Chicago, Weatherford & Brazos Valley.—This company has been organized at Weatherford, Tex., to build a line from Weatherford, Tex., to a connection with the Chicago, Rock Island & Pacific main line either at Bridgeport or at Paradise, in Wise County. The officers are Henry Warren, President; Charles Berthold, Vice-President; George P. Levy, Secretary; R. E. Bell, Treasurer; R. H. Foat, General Manager.

Colorado Springs & Cripple Creek Short Line.—This company has been organized by W. R. Benzie, of Denver, and others, as a new Cripple Creek railroad project. The route is given as follows: From Colorado Springs west to Colorado City, thence southwest through Bear Creek Canon, Rosamont Park, Seven Lakes Divide, northwest to Gillett, Grassy, Independence and Goldfield and then to Victor, Anaconda and Cripple Creek, following the same course as that taken by the Florence & Cripple Creek and the Midland Terminal roads. The projectors claim that it will be the shortest line between Colorado Springs and Cripple Creek. The distance by this route will be 30 miles.

Georgia & Alabama.—A statement, apparently authoritative, is published that a contract will be signed in a few days between the Georgia Central and the Georgia and Alabama roads, providing for the use by the last-named road of the Georgia Central line from Lyons, Ga., into the city of Savannah.

Kansas City, Fort Scott & Memphis.—The company, it is said, proposes to extend its lines south through the Indian Territory, from Baxter Springs, in the southern part of Kansas. A bill granting the company right of way through the Shawnee, Quapaws, Ottawa and Wyandotte Indian reservations will be introduced in Congress shortly.

Lindsay, Haliburton & Mattawa.—A bill to incorporate this company is now pending in the Dominion Parliament. The company has been organized with Major S. Hughes, M. P., of Lindsay, Ont., as President. The company proposes to begin construction work next fall. The road is to extend from Haliburton, Ont., the present terminus of the Victoria branch of the Midland Division of the Grand Trunk to Mattawa, on the C. P. R., on the Ottawa and Mattawa Rivers. The route is through a new country, well wooded with pine, birch, tamarac, cedar, maple, ash, spruce and elm. There is good farming land, and fishing and hunting. Several surveys have been made. The work in some parts is fairly difficult on account of small rock ridges, but as a rule the road will be level and the curves easy. By increasing the length four or five miles an easy route can be obtained. There will be a considerable number of small bridges, but no large ones.

Mexican Central.—Tracklaying has been commenced on the extension from Guadalajara toward Ameca, Mex., and have about eight kilometers laid. About six miles of the work on this line is heavy, but the balance is light. There are 1,250 men employed on construction at present. The grades are one and a half per cent. descending toward Ameca with six-degree curves on 20-meter chords. There are 62 stone-arch culverts being built, four girder bridges and five or six pile bridges. The line is 655 miles long between Guadalajara and Ameca.

New Roads.—Local interest is being aroused in a proposed road from Manchester to Oneida, Ia., at the junction of the Chicago, Milwaukee & St. Paul, with the Chicago Great Western, and thence to Galesburg, and to terminate at the Mississippi River. A preliminary survey has been made over a portion of the route.

Nypano.—The reorganizers of the New York, Pennsylvania & Ohio in incorporating the new company have adopted as its legal title the abbreviated form of the old name by which it was commonly known. The charter for the Ohio company was filed last week, the capital stock being $15,000,000. The Pennsylvania corporation will have a capital stock of $4,500,000. The capital stock of the consolidated company will be $20,000,000. Bonds for the same amount will be issued. The incorporators in Ohio are Charles E. Whitehead, John Tod, E. R. Perkins, Alba Mark Tucker and John P. Dynes.

Ottawa, Arnprior & Parry Sound.—The contract for the last 47 miles of the road has recently been awarded to E. F. Fauquier, of Toronto, as noted in this column. Surveys have been completed and the work of clearing the right of-way, trestling across bays of lakes and some rock excavation is now going on, there being between three and four hundred men employed at the present time. Much of the work is exceptionally heavy; about 30 miles is through a wilderness, 25 miles of this being through Ontario's Algonquin National Park. Since Jan. 1, 1895 there has been 20 miles of track laid from Whitney to Cache Lake. The maximum grades are 52.8 ft. per mile eastward and 66 ft. per mile going west, and 6 deg. curves are the sharpest on any portion of the line. Mr. Fauquier has sublet 37 miles, the names of subcontractors and leugths of sections are as follows: D. D. McDonald, of Whitney, Ont., 10 miles; O'Neil & Ferguson, of Whitney, Ont., 12 miles; Poulin & Fitzpatrick, of Emsdale, Ont, 15 miles. The above contracts are for substructure only, the company putting on all bridges, trestles and laying track and ballast. The grading for the entire 47 miles is to be completed during the month of September and tracklaying and ballasting will be pushed to completion, so that the road will be open for traffic before Jan. 1, 1897. J. R. Booth, of Ottawa, is President, and George A. Mountain, of Ottawa, Chief Engineer.

Port Arthur, Duluth & Western.—The directors of the road are seeking aid from the Canadian Parliament, which is now in session, and, if granted, it will result in the extension of the road this year from its present terminus at Gunflint Lake, Man., near the head of Lake Superior, to Mine Center, and possibly to Fort Francis, in the Rainy Lake gold region.

Seaboard Air Line.—The town of Union, S. C., will probably build a line to connect with this system, but as yet it has not been decided whether to make the connection at Clinton or Whitmere's.

South Carolina & Georgia.—A second track will be built through the city to the site on the water front at Augusta, Ga., where a compress and union warehouse is to be erected by a company formed last week and in which the railroad company is interested. The 200,000 bales of cotton marketed at Augusta will be compressed there and shipped over this road.

Youghiogheny Valley.—This company was chartered at Harrisburg, Pa., last week, with a capital stock of $120,000 to build a 12-mile line from Versailles through Elizabeth Township and Suter Borough to West Newton, Pa. Ira J. Nilson, of Pittsburgh, is President.

Electric Railroad Construction.

Akron.—Application has been made to the County Commissioners by the Akron & Canton Railroad Co. for a franchise to build an electric road from Uniontown to Akron.

Anderson, Ind.—The Indiana Interurban Railway Co. has been incorporated with a capital stock of $50,000 by N. J. Clodfelter, of Indianapolis, Ind., to build an electric railroad from Anderson to Muncie.

Ashland, Pa.—The Centralia, Ashland & Locust Gap Railroad Co. has been granted a charter for an electric road about six miles long between the three places. It will also connect with the Schuylkill Traction Road at Locustdale and with the Mount Carmel & Shamokin Electric Railway at Centralia. A. S. Laubenstein is President, and some of the incorporators are: James A. McCarthy, Thomas B. Pepper, Jr., and William A. Marr.

Baltimore, Md.—The Shore Line Electric Railway Co., which is owned by the Baltimore Traction Co, is building a road about 2½ miles long from Ridgely and Ostend streets to the Patapsco River, where there is to be a summer resort. The capital stock of this company is $200,000, but it is said application will be made to increase it to $1,000,000, so that other extensions may be made. This road will be run in conjunction with the Huntingdon Avenue, Freemont, Paca and Conway street lines of the Baltimore Traction Company.

The Baltimore, Middle River & Sparrow's Point Electric Railway Co. has awarded the contract for the steam plant for its power house, near Back River, to the S. Davies Warfield Mfg. Co.

The Commissioners of Hyattsville have granted the Columbia & Maryland Electric Railway Co. the right of way through Hyattsville.

Bonham, Tex.—The Bonham Electric Railway, Light & Power Co. has been formed, with a capital stock of $25,000, to build street railroads and generate light and power in Bonham. Some of the incorporators are: H. C. Alexander, R. B. Semple, C. L. Bradford, T. E. Kennedy and J. W. Russell.

Chester, Pa.—A charter has been granted to the Chester & Maple Electric Railway Co. The road will be 12 miles long and the capital is $72,000. Among the incorporators are: W. I. Schaffer, Josiah Smith, Thos. H. Berry and W. C. Sproul. Warner H. Jenkins, of St. Davids, is President.

Chicago, Ill.—The Suburban Electric Railway Co. has prepared plans and specifications for about 25 miles of track and overhead work, also for cars, motors and generators. Bridges will also be required. C. S. Leed, 100 Washington street, is General Manager.

Clarksville, Tenn.—The Clarksville Street Railway Co. will make contracts for replacing the five miles of street railroads, now operated by horses, with iron or steel T-rails for an electric railroad and for overhead construction; also for supplying two engines and boilers of at least 150 H. P. each, two 100 k.w. generators, ten 25 H. P. motors and five 15, 16 or 18-ft. cars. T. A. Small, 111 South Tenth street, Clarksville, is Superintendent. The company has issued $100,000 of first mortgage 6 per cent. bonds maturing March 1, 1926, and offers these bonds for sale. The company has a perpetual charter and an exclusive 50 years city franchise. H. Clark is Treasurer of the company.

Colorado Springs, Col.—The Colorado Springs & Cripple Creek Short Line Railway Co. has been incorporated by W. R. Berrie, L. S. Atkinson, F. L. Burton and others of Colorado Springs, to build an electric railroad from Colorado Springs to Cripple Creek. The capital stock is $1,000,000.

Danville, Va.—The Danville & Riverside Railway Co. has been incorporated by T. B. Fitzgerald, J. H. Schoolfield, R. I. Anderson and others to build an electric railroad. The capital stock is to be not less than $25,000.

Falls Church, Va.—A bill has been passed by Congress for building an electric railroad from Falls Church to Washington. The road is to enter Washington by crossing the Potomac by a ferry at E and Twenty-sixth streets (Georgetown) and run to Seventh and B streets, northwest. The bill provides that the railroad company is to pay 4 per cent. of its gross receipts to the District of Columbia and to deposit $1,000 to insure the immediate building of the road. The company is also not allowed to handle freight in certain parts of Washington.

Hamilton, Ont.—The President of the Hamilton & Dundas Railway Co. will submit a proposition to the City Council for changing the road into an electric line. The road extends from Dundas to this city about six miles.

Horseheads, N. Y.—Work on the new electric railroad between Horseheads and Watkins will be commenced as soon as the frost is out of the ground and it is expected that the road will be completed by July 1.

Ilion, N. Y.—The Ilion Street Railway Co. has been incorporated with a capital stock of $10,000, by S. G. Heacock, F. S. Brooks, W. E. Walker and others to build an electric railroad in Ilion.

Kingston, N. Y.—The Kingston & Lake Katrine Railroad Co. has been incorporated by Richard Lelahon, J. F. Dwyer, C. W. Crispell, of Kingston, and others to build a street railroad in Ulster County. The capital stock is $100,000,

Media, Pa.—Arrangements are being made for beginning work on the Media, Aston & Middleton electric railroad. Congressman Robinson is President.

Middleboro, Mass.—The Middleboro & Lakeville Street Railway Co. has been incorporated with a capital stock of $100,000.

Middlesburgh, Pa.—The Middlesburgh & Brookside Railway Co. has been incorporated, with a capital stock of $230,000, to build an electric railroad in Dauphin and Schuylkill counties. W. B. Schofield, of Camden, N. J., is President.

Montreal, Que.—The Town Council of Lachine has granted the Montreal Park & Island Railway right of way through the town. It is proposed to build this road in the spring, and to extend the Outremont line to St. Laurent.

New Westminster, B. C.—The City Council has received a communication from J. Buntzen, Secretary of the Consolidated Railway & Light Co., offering to build an electric railroad from Westminster to Stevenson, a distance of about 40 miles.

Oshkosh, Wis.—Articles of incorporation of the Oshkosh, Berlin & Omro Railroad have been filed. The object is to build an electric road from Oshkosh to Berlin by way of Omro and Eureka, a distance of about 40 miles. It will be laid along the highways, and the right of way has been secured between Oshkosh and Omro. The promoters of the enterprise are Mayor Kellogg, ex-Mayor Dichmann, Leander Choate, Thomas Wall and John Martin, a railroad builder.

Ottawa, Ont.—Preparations are being made to extend the electric railroad to Britannia. It is expected that the road will be completed by the middle of July. Its construction will necessitate the erection of a bridge across the Deschenes Rapids.

Owosso, Mich.—The electric street railroad between this city and Corunna was opened for traffic last week. The trips between the two towns, which are about four miles apart, are made at 15 minute intervals. The Owosso end of the line will be extended two miles as soon as spring opens.

Palestine, Tex.—The Palestine Street Railway & Electric Light Co. has asked for a 50-year franchise for an electric street railroad and electric lights.

Philadelphia.—The Union Traction Co. will build a new power station at Willow Grove, on the Old York road line. The new station will be 80 ft. × 110 ft., and work will be begun at once. Four generators and engines of 300 H. P. each will be installed in the station, and they will be used to supply power for the upper end of the York road line and for the lights and various motors in the company's new park at Willow Grove. This will make the tenth power station of the Union Traction's system, and with it the aggregate horse power will be 32,000.

A charter has been granted to the Hillcrest Avenue Passenger Railway Co. for an electric road, a mile and a half long on Hillcrest avenue and other streets in Chestnut Hill. The capital stock is $10,000 and John L. Welsh is President.

Pittsburgh, Pa.—The work of changing the Penn avenue and Butler street railroads from cable to electric traction lines will begin as soon as the weather will permit.

Pittston, Pa.—Work on the Scranton & Pittston Tracton Co.'s new line, between Pittston & Avoca, has been completed by Contractor Page. This makes the line from Glen Lyon to Carbondale complete. Hon. L. A. Waters, of Scranton, is President.

Richmond, Va.—The Capital Electric Co. has been incorporated by William H. Hathiton, P. B. Shield, Nelson Perrin and others to build an electric railroad between Richmond, Manchester and Petersburg. The company may also do a general electrical business. The stock is placed at not less than $50,000 nor more than $1,000,000.

St. Catharines, Ont.—Albert Phenis, New York; S. S. Oille, S. E. Patterson and J. S. Campbell, of St. Catharines, and Henry A. King, of Toronto, have petitioned to incorporate the Lincoln Radial Electric Railway Co., with power to take over the assets of the Lincoln Street Railway & Traction Co. and to extend its lines.

The Port Dalhousie, St. Catharines & Thorold Electric Street Railway Co. has decided to build eight miles of overhead structures, and two miles of track as soon a the weather permits.

San Francisco, Cal.—The Continental Motor Traction Co. has been incorporated by W. J. Bowie, C. I. Ives, Philip La Montague, and others, of San Francisco, to build electric railroads and to do a general electric business in San Francisco. The capital stock is $1,000,000.

Skowhegan, Me.—The Somerset Traction Co., whose road now extends from Skowhegan to Madison, will build a branch of their electric road commencing at Cold Brook and running directly north to East Madison, a distance of five miles. This will make about 18 miles of road Instead of following the roadway, as most electric roads do, this company bought land alongside of the road from Skowhegan to Madison and cleared away the fences and sunk the stone walls for a roadbed. The road is ballasted for some distance with crushed rock.

Springfield, O.—T. D. Hoskins, of the Hoskins Gasoline Motor Co. has applied to the County Commissioners for a franchise for a railroad on the National pike road. The cars are to be run by the Hoskins gasoline motor.

Towanda, Pa.—The Towanda Traction Co. has applied to have its name changed to the Bradford County Railway Co. and for franchises for a road from Towanda to Canton. The Traction Co. has been reorganized and C. A. Innes, of Canton, elected President.

Temple, Tex.—Application has been made for a franchise for an electric railroad by J. T. Gillett, T. L. Hollingsworth and other men of Temple They propose to build the road on the principal streets of the town, and agree to have cars running in one year from the time of receiving the franchise.

Vineyard Haven, Mass.—The Vineyard Haven & Cottage Street Railway Co. has been granted a franchise. Hon. Josiah Quincy, of Boston, is President.

Yonkers, N. Y.—The Yonkers & Tarrytown Electric Railway Co. last week was incorporated to operate a street surface railroad 13 miles long, from Yonkers to Tarrytown. The capital is $750,000. Among the directors are: James M. Edwards, John H. Ingram and Otto Ross, of New York City; John F. Van Name and Charles M Calhoun, of Bridgeport, Conn.

Westbrook, Me.—The Portland Extension Railroad Co. has been incorporated with a capital stock of $50,000 by W. D. Davis and Charles F. Libby, of Portland, W. A. Wheeler, of Brooklyn, and others, to build an electric railroad from Westbrook to Gorham.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The following report of earnings for January is the first statement issued by the new company. The form of statement has been changed from that used by the receivers. The earnings of the St. Louis & San Francisco and the Atlantic & Pacific are no longer reported by the Atchison. The weekly statement of approximate earnings has been discontinued. The monthly reports now include the earnings of the Gulf, Colorado & Santa Fe, Southern California, New Mexico & Arizona and Sonora roads:

Month of January:

	1896.	1895.	Inc. or Dec.
Gross earn....	$2,484,664	$2,234,941	I. $249,722
Oper. exp....	1,721,028	1,755,657	D. 34,629
Net earn.....	763,636	479,285	I. 284,351

Baltimore & Ohio.—On the application of the attorneys of the company, President J. K. Cowen and Vice-President Oscar G. Murray were appointed Receivers of the company by Judges Goff and Morris in the United States Circuit Court, at Baltimore, on Feb. 29. The jurisdiction of the Receivers does not include the Baltimore & Ohio Southwestern and the Staten Island Rapid Transit, which are controlled by the Baltimore & Ohio. A separate Receiver has been appointed for the Pittsburgh & Western. The immediate cause for the receivership was the inability of the company to secure funds needed for the payment of interest due on March 1. The rolling stock and roadbed of the company are admitted to be in poor condition and it is stated that the Receivers will use all available funds for betterment purposes. The rolling stock will be overhauled and Receivers' certificates may be issued to provide new locomotives and cars.

President Cowen issued an official statement substantially as follows: A committee composed of the New York directors has been for sometime engaged on a plan for funding the floating debt and to provide additional capital. Until Saturday there was the strongest belief upon the part of the committee and the members of the syndicate that the plan proposed would be adopted in time to meet the company's requirements. After full consultation, however, it was found to be expedient to carry out all the details of the plan without the aid of the court, and for that reason it became necessary to begin a friendly suit for the appointment of receivers. Prior to the commencement of the suit, however, the whole matter was laid before the directors and they authorized the company's officers to confess a judgment in favor of the Mercantile Trust Co. for the amount of the debt due to that company, held by it on behalf of the syndicate, and also consenting to the appointment of receivers for the property.

The board at the same time requested the New York directors, who have been preparing a plan for the rehabilitation of the company without foreclosure, to organize themselves as a committee, with power to add to their number, or to associate with them a committee in London for the protection of the interests of all the security and shareholders, with a view to the immediate reorganization of the company and its affairs. . . . These gentlemen expect to present a plan for the extinguishment of the entire floating debt of the company, the furnishing of new capital and the placing of the company's finances upon a firm and stable basis. . . .

The persistent rumors spread through the public press to the effect that the report of Mr. Stephen Little did not confirm the report of the company's accounting officers made to the syndicate under date of Feb. 1, 1896, are entirely without foundation; on the contrary, Mr. Little's examination fully confirms the report of the company's accounting officers, made Feb. 1, 1896, of the company's floating indebtedness, income, etc.

Belvidere-Delaware.—At a meeting of the stockholders of the Martin's Creek Railway Company of Pennsylvania, the Enterprise Railroad Company and the Martin's Creek Railway Company of New Jersey, held last week, it was agreed to consent to the merging of these lines, which are short lines, in New Jersey, controlled by the Pennsylvania, into the Belvidere-Delaware Railroad Company. Before this action can be consummated the consent of the legislature of New Jersey will have to be obtained, but it is thought there will be no trouble in securing it.

Chesapeake & Ohio.—This company has bought the belt line at Glasgow, Va., 1½ miles long, formerly owned by a Glasgow iron and furnace company, and will now build a bridge across North river and, by the belt line, make Glasgow the connecting point on the Lexington, Va., branch road, instead of Balcony Falls, which has heretofore been the junction of the roads. The belt line was originally built to connect the Chesapeake & Ohio and the Norfolk & Western roads, which enter Glasgow on opposite sides of the town, and was sold at auction together with other property of the Glasgow Company.

Flint & Pere Marquette.—It is officially announced by General Manager Crapo and General Manager Ashley of the Ann Arbor, that an agreement has been made by which this company will secure an entrance to Toledo. All of the details have been perfected and as soon as the new track can be laid the Flint & Pere Marquette will run its trains into Toledo using the Ann Arbor terminal.

Lehigh Coal & Navigation Co.—The annual report for the year 1895 shows a total revenue of $1,692,878, and disbursements amounting to $1,253,947, the surplus for the year being $438,931. Two dividends of $1 a share each were paid during the year, amounting to $573,866, the difference charged to profit and loss being $134,935. The coal tonnage for the year amounted to 5,594,020 gross tons, an increase over the previous year of 429,156 tons. The gross receipts of the Lehigh & Susquehanna Railroad aggregated $4,608,435.20, of which $3,172,109 was for coal, $1,217,709 for freight and express, and $218,617 for passengers and mails. The increase in gross earnings over the preceding year amounted to $400,504. This makes an increase in the rental earned of $133,561. There was a small loss on the coal mined and a small increase in production. Mining was interfered with by a scarcity of cars in the first nine months, and a scarcity of water at the mines in the latter part of the year.

Norfolk & Western.—The plan of reorganization has been arranged, but has not yet been officially announced. However, an apparently authoritative statement has been issued giving the following particulars: The new securities will include only three classes: A first consolidated 4 per cent. mortgage for $60,000,000, preferred stock $25,000,000 and common stock $66,000,000. Of the bonds about $23,000,000 will be required to take up such securities as are disturbed under the plan and the balance are reserved for undisturbed bonds as they mature and for betterments, equipment, etc. The above-mentioned $23,000,000 of bonds and a like amount of preferred stock will be used to adjust the disturbed bonds, viz.: Adjustment bonds; 100-year bonds, Maryland & Washington, Clinch Valley, Equipment, Roanoke & Southern and Lynchburg & Durham. The old common and preferred stock, on payment of an assessment of $12.50 per share, will receive new common stock, the old common 75 per cent. and the preferred 112 per cent. The assessment will be underwritten by a syndicate.

North Carolina.—The suit brought by the Attorney-General of North Carolina at the instance of the Farmers' Alliance of the state to annul the lease of the road to the Southern for 99 years (which went into effect Jan. 1, 1896) was withdrawn last week. The other suit brought for a similar object by small stockholders, having also been withdrawn several weeks ago, all legal controversy over the lease has been brought to an end. Accordingly a meeting of the Board of Directors of the road was held in Charlotte, N. C., Feb. 28, and a committee consisting of President S. B. Alexander, W. C. Maxwell and T. J. Allison, was appointed to receive the securities given by the Southern Railway Company for the payment of the semi-annual interest or rental of $140,000 (6 per cent. on the stock). After five years it is to be 6½ per cent. The securities consist of $200,000 of registered Southern Railway first mortgage bonds.

Philadelphia & Reading.—The following statement shows the earnings and expenses of the railroad company for January, 1896, as compared with the same time last year:

Month of January:

	1896.	1895.	Inc. or Dec.
Gross receipts.....	$1,725,452	$1,568,307	I. $157,144
Gross exp.....	578.192	942,020	I. 36.172
Profit in operating.....	$747,259	$626,287	I. $120,972
Other receipts.....	79 187	89 013	D. 9,825
Profit for month.....	$826,447	$715,300	$111,146
Equipment payments...	38,561	106,930	68,369
Terminal trackage	40,000	37,831	2,168
Fixed charges (estimated).....	695,600	694,274	725
Total charges....	$788,927	$859,283	$70,356
Surplus.....	$37,519 (def.)	$143,983	$181,503
Year to date:			
Gross receipts.....	$3,558,709	$3,120,235	I. $438,473
Gross exp.....	1,995,711	1,889,086	I. 106,624
Profit in operating ..	$1,562,998	$1,231,148	I. $331,849
Other receipts.....	154,527	161,955	D. 7,428
Profit for month.....	$1,715,525	$1,393,104	I. $324,420
Total charges.....	$2,162,095	$1,725,671	I. $436,423
Deficit.....	$444,570	$332,567	I. $112,002

The gross earnings of the Coal and Iron Co. were $1,853,451 in January, and there was a profit in mining of $22,341. The deficit on the month's operations was only $72,658, against a deficit of $193,372 in 1895.

Pittsburgh & Western.—This road, which was acquired by the Baltimore & Ohio in 1891, has been placed in the hands of a receiver. Thomas M. King, Second Vice-President of the Baltimore & Ohio, has been named as Receiver.

Virginia Iron & Railway.—This company, operating a furnace in Virginia, on the main line of the Chesapeake & Ohio, has gone into the hands of a receiver, Mr. J. Mahoney, its former General Manager, being appointed by the court. In addition to its furnace plant the company owns and operates the Victoria & Western and the Rockbridge, Alum & Goshen roads, 12 miles long, to its iron ore deposits and fluxing quarries near the Rockbridge Alum Springs. The corporation's liabilities are $325,000. Its first mortgage bonds amount to $200,000, and the balance of its indebtedness is well secured.

Electric Railroad News.

Baltimore, Md.—The City & Suburban Railway Co. has guaranteed the entire $1,000,000 issue of 50-year 5 per cent. bonds of the old Lake Roland Elevated Railway Co., which mature in 1942. These came into the control of the City & Suburban Railway Co. when it a year ago acquired the Lake Roland Elevated. The securities will be soon placed upon the market.

Brooklyn.—Since the election of Mr. Clinton S. Rossiter as President and Col. T. S. Williams as Secretary and Treasurer, last July, many improvements have been made in the operation of this system, which controls over 200 miles of track in the city of Brooklyn. The complete system of transfers, described in our issue of Oct. 11, 1895; the reduction of certain fares from eight cents to five cents; improvements in equipment and extensions of the road, are among the changes. The following shows the gross earnings of the company for the month of February, 1896, and eight months ending Feb. 29 of the same year compared with the two corresponding periods of 1894 and 1895:

	1894.	1895.	1896
Month of February....	$278,035.00	$158,777 64	$315,313.43
Eight months ending Feb. 29.....	2,823,836.87	2,733,348.21	2,882,575.76

Conshohocken, Pa.—The Schuylkill Traction Co. has announced that after March 1 the fare for a continuous ride anywhere in the borough will be reduced to three cents. The length of the road in Conshohocken is about two miles.

Chattanooga, Tenn.—The Chattanooga Electric Railway, which has 28 miles of track, was sold last week to C. A. Lyerly, in behalf of the second mortgage bondholders, for $28,000, subject to a lien of $550,000, the amount of the first mortgage bonds. The stock is held by the W. K. Roots estate, Little Rock, Mississippi, Chattanooga and New York capitalists. The St. Louis Trust Co. was Trustee.

Madison, Wis.—The Madison Street Railway Co. has gone into the hands of a Receiver for the second time. The first receivership, brought about by the electric light and power company which furnishes the motive power, was recently discharged, but the recent action is brought by the New York Guaranty, which holds the bonds, $150,000, on which nearly $15,000 interest is due. Maj. F. W. Oakley is made Receiver.

Philadelphia.—The Electro-Magnetic Traction Co. offers for subscription $300,000 of its capital stock, the total issue of which is $1,500,000, par value $50 per share. The terms of sale are $25 per share, payable at the time of subscribing, and $5 per share for five consecutive months thereafter. The subscription books will be opened on March 5, at the office of the company, 608 Chestnut street. The President of the company is Jacob E. Ridgway.

The Street Railway Committee has reported unfavorably on the ordinances granting privileges to the East, Western & Enterprise Passenger Railway Co., the routes of which include most of the streets in the built-up section of the city not now occupied by the tracks.

Pontiac, Mich.—The Aldermen have refused to grant a franchise to the Pontiac & Sylvan Lake Electric Railway Co. to extend its line on South Saginaw street and for the exclusive use of Auburn, Paddock and Mount Clemens streets.

TRAFFIC.

Traffic Notes.

The railroads centering in New Orleans have formed a Local Passenger Association at that city. Capt. I. Hardy, of the New Orleans & Northeastern, is chairman.

It is expected by vessel men that the season of lake navigation for 1896 will open unusually early. The connecting channels have not frozen as heavily as usually. Boats may be in commission from Duluth to Buffalo by April 15. Several of the ore roads will put their ore train schedules in effect April 1. This will have no small influence on freight rates and tonnage for the season.

Representatives of roads in the Southern States Freight Association met in New York last week for the purpose of discussing an agreement for the distribution of freight. Chairman H. S. Haines presided, and among those present were Messrs. Finley and Culp, of the Southern; Emerson, of the Atlantic Coast Line; Jackson, of the Georgia: Shellman, of the Central of Georgia; Eger, of the Clyde Line, and Erwin, of the Plant System. It is said that the results were encouraging. All of the lines promised to act under the existing agreement and accept the rulings of Chairman Haines until such rulings should be reversed by the Executive Committee. There has been a disposition on the part of some lines to interpret the agreement according to their individual notions. The Seaboard Air Line is not a member of this association.

The Board of Managers of the Joint Traffic Association has decided that the Trunk Lines shall decline to participate in drayage or wharfage charges in New Orleans and other Gulf ports on eastbound traffic. Mr. R. B. F. Peirce, receiver of the Toledo, St. Louis & Kansas City, has assured the Board of Managers of the Joint Traffic Association that he will co-operate with the association. It is reported that the Norfolk & Western and other roads operating the Cumberland Gap Despatch have been asked to join the Joint Traffic Association, but that they have "resisted the pressure." The hearing on the injunction suit to annul the Joint Traffic Association has again been postponed, this time to March 16.

President M. E. Ingalls, of the Big Four and the Chesapeake & Ohio, says that if the business diverted to the Gulf of Mexico were divided among the trunk lines, it would not amount to $25,000 for each. On the other hand, had the railroads undertaken to secure this business by cutting rates, their loss would have amounted to a great deal more than the diversion. The crucial test for the association is during this month, when business is dull. After March there will be a general picking up of local miscellaneous traffic and revenue will be satisfactory.

Chicago Traffic Matters.

CHICAGO, March 4, 1896.

The Atchison, Topeka & Santa Fe has cancelled all through rates on grain from Illinois points on its lines to the territory east of Buffalo and Pittsburgh. Hereafter this road, in common with the Alton, the Chicago Great Western and the Chicago & Northwestern will quote the sums of the local rates on grain from all Illinois points to trunk line territory. The common point rate from Illinois to New York was 22 cents. The rate now is 6 cents to Chicago and 20 cents from this city to New York, making an advance of 4 cents. Officers of the Santa Fe say they have been forced to take this action on account of the arbitrary charges which the Eastern lines deduct from the Western roads' proportion. Some Chicago grain merchants think this will help the Chicago market, as the grain will be stored here to await the low water rates; others say that the traffic will be diverted from Chicago to the lines south of this city.

The Chicago & Eastern Illinois has given notice that it will make no charge for the transportation of bicycles in baggage cars.

Milwaukee shippers are protesting against the abolition of the lake and rail rates which have been quoted for years from that city to Southeastern territory, across Lake Michigan, and which were recently withdrawn. A conference with the freight officers of the Chicago and Ohio River roads was held, but nothing came of it.

Chicago scalpers are still alive. It has just come to the surface that about ten days ago the Fitchburg road sent several hundred first-class Boston tickets to some Chicago brokers. They read over the Nickel Plate, and some by the Wabash, and the West Shore and the Fitchburg and were sold at a uniform rate $2 below the differential fare. When the deal was discovered the Wabash refused to honor any of the tickets. The Nickel Plate, the Wabash and the West Shore were charged with violating the rules of the Joint Traffic Association in honoring any of the cut-rate tickets, and at the recent joint meeting in New York the matter was warmly discussed; the Fitchburg finally agreed to withdraw the tickets.

Chairman Caldwell, of the Western Passenger Association, has ruled that tickets purchased in the open market must be redeemed at full tariff rates by the roads issuing them even though the brokers handling them exact full tariff rates in selling them.

The shipments of all freight, except live stock, from Chicago, eastbound, last week, aggregated 90,372 tons, as against 57,692 tons the preceding week and 58,768 tons last year. The shipments were distributed as follows: Michigan Central, 8,665 tons; Wabash, 6,540 tons; Lake Shore, 13,132 tons; Fort Wayne, 9,216 tons; Pan Handle, 9,754 tons; Baltimore & Ohio, 7,201 tons; Chicago & Grand Trunk, 11,030 tons; New York, Chicago & St. Louis, 6,246 tons; Erie, 14,358 tons, and C., C., C. & St. L., 4,430 tons.

The Western Association of General Baggage Agents has unanimously adopted a rule that no single piece of baggage exceeding 40 cu. ft. in measurement, or 250 lbs. in weight, will hereafter be accepted for transportation in baggage cars. The space limit seems very liberal. It would take in a trunk about 3×2½×5 ft.